December 1974

Smithsonian

Twilight view of the Smithsonian's newest addition, the Hirshhorn Museum and Sculpture Garden (back cover and p. 34)

December 25, 1974
(As if you needed an excuse to be generous.)

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While the cost of just about everything has risen dramatically in recent years, the cost of doing things by computer has been a noteworthy exception.

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This astonishing reduction in a computer's per-function cost has led to important savings in the overall cost of doing a given data processing task. It has been brought about by technological advances such as the miniaturization of computer circuitry. Such advances have made possible vast increases in computation speed—from about 2,000 multiplications a second on an IBM computer in 1952 to more than 2,000,000 a second today.

These improvements have resulted from constant pioneering by hundreds of companies in the data processing industry, pioneering that continues today. Over the years, IBM has invested more than $6 of every $100 of gross income in research and development.

Lowered computation costs make it practical to use computers in an ever-widening range of applications—resulting in such benefits as faster handling of airlines reservations, better use of resources in manufacturing, and the saving of human lives through swift medical diagnosis.

Further reductions could bring about still greater benefits—benefits that will be seriously needed. Should the world's population increase by some 800 million people by 1985 as expected, there will be unprecedented demands for food, shelter, clothing, medicine, transportation and other necessities of life. The computer can greatly aid productivity in each of these areas.

In the future, as in the past, the lower the cost of computing, the more significant the computer's contributions to society can be.

IBM

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Smithsonian

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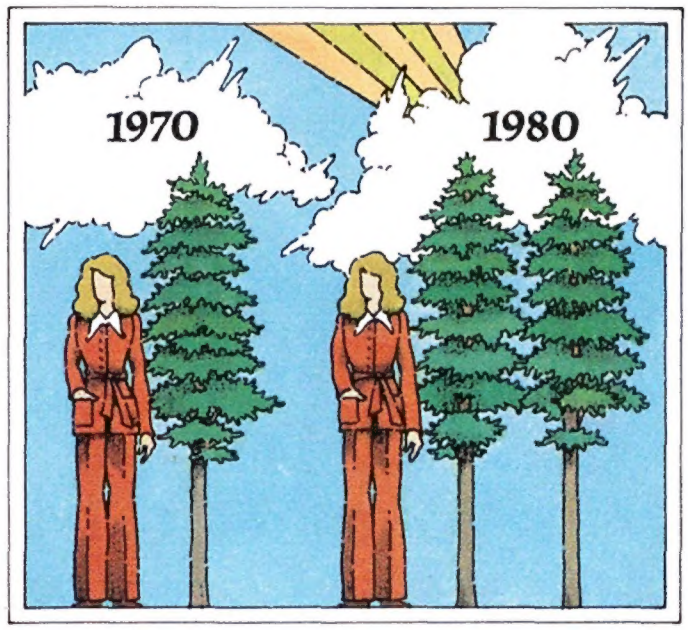

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The view from the castle

Now ten years old, Mexico City's National Museum of Anthropology continues to be the finest of its kind in the hemisphere

The opening of a museum is a great happening. We have just opened one in Washington, the Hirshhorn Museum and Sculpture Garden (pp. 34-45), an event of the first magnitude for this city and millions of other Americans who visit Washington. But ten years ago, in 1964, the National Museum of Anthropology in Mexico City opened. So when my wife and I were invited by Mexican television to the tenth anniversary ceremonies in late September, we were glad to attend and see what an event of such magnitude for Mexico had produced.

I am confirmed in my first impressions: The National Museum in Mexico City is the most important museum of its kind in the Western Hemisphere. It has more to tell us of the whole evolution of a marvelous part of the globe than any other single museum that I have visited.

Technically a museum of anthropology, it is far more important as an institution than its official title suggests. It is a museum of all the people, a museum of Man within the setting of one country and several cultures. Its symbolic meaning is far greater than the awesome chronology of history, the rise and fall of cultures, portends. It tells everything. It wraps it all up in a way which has stunning impact.

Hotel lobbies in Mexico City are awash with tourists ebbing in and out of the local branch of the tourist office, or questioning the bell captain about taxi service, all trying in some way to pack as much into their visit as possible. Significantly, there is an instant priority which emerges from the conversations of people patiently waiting in lines or in overstuffed chairs: "How can I get to the Museum of Anthropology?" "Have you been to the Museum of Anthropology yet?" "You must go to the Museum of Anthropology first off" (this from a Mexican tour guide).

How does all this happen? How is it possible? To be sure, in Leningrad, everyone wants to go first to the Hermitage. But in what other city of the world is the priority a museum of anthropology? Not in Rome, Paris, Athens, London or New York. Truly, this museum is without parallel.

Why does a coiled Aztec 15th-century serpent from Tenochtitlán remind me of the coiled Hellenistic serpent of Constanța in Romania? Why does the carved diorite squash from the same site remind me of early Chinese pottery—some of which was in a wonderful Chinese archaeological-*cum*-art show in a temporary exhibition gallery. Why do the early clay figures speak so irresistibly of *haniwa* from Japan or Mesopotamian cultures? Why are we reminded of Picasso's cubism by the late classical period sculptures of Xochicalco (even though Picasso was influenced by African rather than Mesoamerican art)? It is tempting to look for artistic parallels and cultural diffusion in the unknown historic realm of pre-Columbian times.

The impact in total of this museum is greater to me than any other I can think of (and so it must be to hordes of others), for in its exhibits the strength of a whole nation is revealed in its origins, its diversity and the pride, courage and hope that diversity can give. It reassures the visitor that within oneself rests all the history of Man.

S. Dillon Ripley

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Letters to the Editor

New political machines

Dear Sir: I don't always agree with Sociologist Amitai Etzioni, who was quoted on the evils of the "new machines in the new politics" in your October issue, but in this case I think he is absolutely correct. Usage of computerized results to pinpoint the precise mood of the voter might lead to the practice of Congressmen introducing bills and then hiring the pollsters to determine which ones become laws.

I have no general objection to printed statements, mimeographed statements, advertisements and even commercials, but anyone who writes me a "personal letter" by computer is, in fact, committing a fraud, though not a crime. His letter will end up in the same place as the "personal sales letters" do, and I'll do whatever I can to see that he does, too.
E. G. Stanley Baker
Drew University
Madison, New Jersey

Exotic bestiary

Dear Sir: I am charmed and delighted with Bonnie Dalzell's exotic bestiary article and paintings. But there is one thing I must know about the bandersnatch: Is it frumious? All the other beasts I can accept, but I simply cannot relate to the bandersnatch unless it is frumious.
Charles J. Armstrong
San Diego, California
We feel Lewis Carroll should have the last word. Ed.

> *"Beware the Jabberwock, my son!*
> *The jaws that bite, the claws that catch!*
> *Beware the Jubjub bird, and shun*
> *The frumious Bandersnatch!"*

Dear Sir: My feeling about your article on exotic bestiary is that such imagination could be well spent on more meaningful problems on Earth, what with Boston, Ireland, South America—you name it.
Ben Willingham
Dallas, Texas

Dear Sir: Upon rereading my article on exotic bestiary, I realize that an error was implied by this sentence: "The much denser atmosphere combined with a slightly greater gravitational attraction improves the lift force of any particular wing." What this seems to say is that the greater air density *and* greater gravity improve lift. What I meant to say was that the greater air density improves lift *despite* the greater gravity.

I am working as a consultant zoologist, not an artist, in Cambridge, Massachusetts. Art is an avocation.
Bonnie Dalzell
Newton, Massachusetts

Columbus' bones

Dear Sir: In Thomas Dozier's article on the whereabouts of Columbus' remains, you state that the inscription "Illtre. y Esdo. Varon Dn. Cristoval Colon" could mean *Illustrious and Esteemed Baron, Don Cristóbal Colón. Varón* in Spanish meant and still means a distinguished man (gentleman), but never Baron (titular). *Barón* in Spanish is the only word for our titular Baron.
M. F. Cueto jr.
Austin, Texas

Trans-Alaska pipeline

Dear Sir: Your article on the trans-Alaska pipeline points to a basic problem that is frequently ignored in the attempt to satisfy our country's energy demand: accounting for, and resolving, the many significant and conflicting ecological factors which are impacted by the decision to implement major pipelines or any similar undertaking. The trans-Alaska pipeline represents, I believe, an example of the shortcomings in our governmental planning and development process for large-scale technology and engineering projects.

The quote in your article—although meant in a different context—("Somewhere in here there's a lesson to be learned, but we're too busy to learn it") typifies the present situation as I see it.
Michael Clow
Huntsville, Alabama

Ambulant studio

Dear Sir: Irving Penn's photographs are amazing. One can keep studying them and seeing new things and getting new ideas. However, as for the fact that "Penn especially prizes a north-light exposure" —when he was referring to Cuzco, below the equator, wouldn't this be light from the south?
Jerome Beatty jr.
Waquoit, Massachusetts
Mr. Beatty is correct. In Cuzco, Peru, at 13 degrees south of the equator, the sun swings around on a northerly path during the day for most of the year. Ed.

Dear Sir: Irving Penn's portraits on anonymous subjects in foreign lands are indeed fascinating, but I wish you had also shown how he posed his models.
Ralph Edwards
Detroit, Michigan

The rare photograph (above) is of Penn posing an Asaro Mud Man in New Guinea. It was taken by his wife, Lisa Fonssagrives-Penn, formerly a noted fashion model. Ed.

The view from the castle

Dear Sir: Mr. Ripley's thoughts on receiving an honorary degree at Cambridge prompt a different memory for me.

As exchange students to England, we too were overwhelmed by the rich pageantry and attention to traditional details. It was the year of Queen Mary's

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funeral and Elizabeth's coronation, a continuing feast of splendor everywhere. But the trappings did not deceive us: As every schoolboy knew, it was Moss Bros. and the like who really mounted the show. Hardly a peer failed to visit the great rental agencies for his wig or ermined cloak. He simply could not afford to do otherwise. England then, as now, was economically vulnerable. The problem began to rock the foundation of every British institution.

Economics, indeed, is the great determinant which Mr. Ripley overlooked in his comments. Beyond any contrived contrast between knee breeches and blue jeans lies a hard reality: Traditional Anglo-American forms, including the regimens which lead to vivid academic processions, are no longer *productive* to industrially mature societies.

Peter Hugens
Darien, Connecticut

Dear Sir: The following statement appears in Mr. Ripley's comments: "The Labor Government seems determined to wipe out private secondary school education. In the name of equality, high-grade education for the few at that level is regarded as immoral by the present government because it allows the better students to forge ahead, thus leaving the less fortunate behind." Mr. Ripley is assuming that the "few" who are educated at these elite institutions are the "better" students. If they are "better," it is not because they are more intelligent but because their parents are wealthier.

Douglas Little
Austin, Texas

Newborn bats

Dear Sir: The opening photograph in my article, "Rare glimpses of newborn bats," unfortunately, was miscaptioned. It should have read: "A side view of a resting adult spotted bat showing the prominent tragus, elaborate blood vessels and folds of the ear. When alert and in flight, the ears are completely erect." The part of the caption, which reads, "Enlarged photograph was made within a day of birth. Baby, only two inches long, weighed four grams," should have accompanied a different picture [shown below].

David A. Easterla
Associate Professor of Biology
Northwest Missouri State University
Maryville, Missouri

Phenomena, comment and notes

Dear Sir: Your item, "Lethal Math," neatly describes how one can present crime statistics in differing formats in

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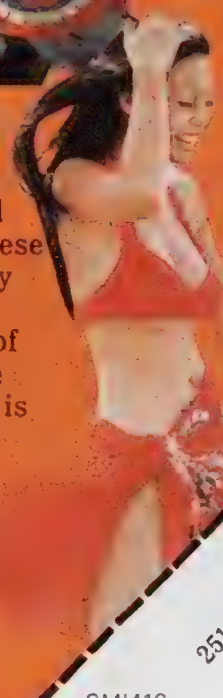

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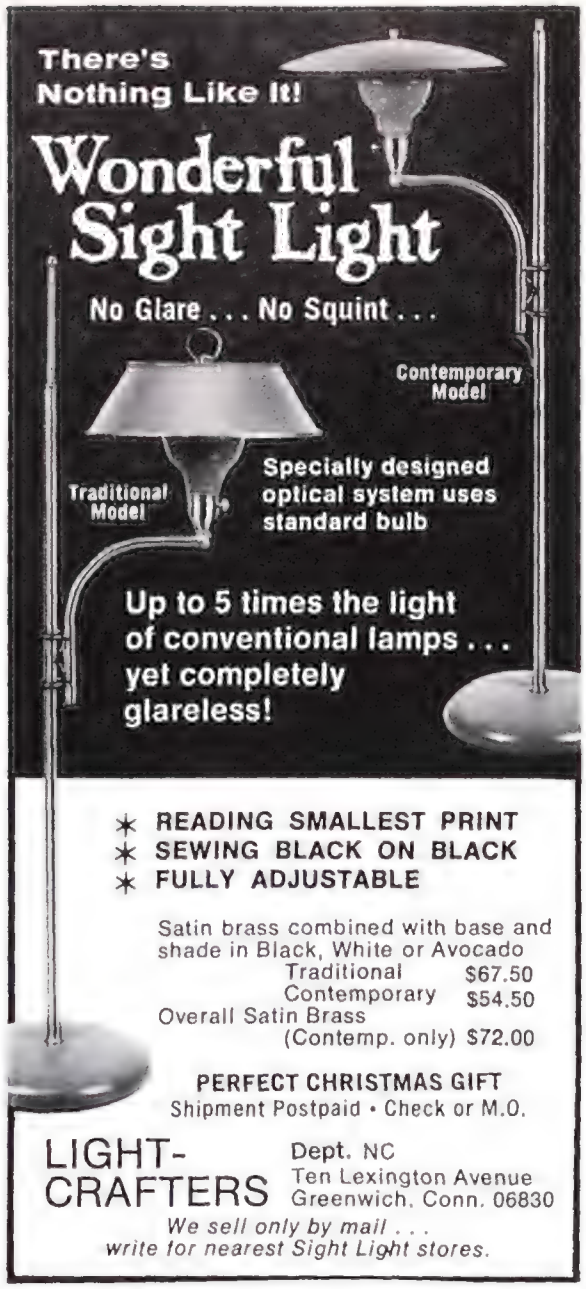
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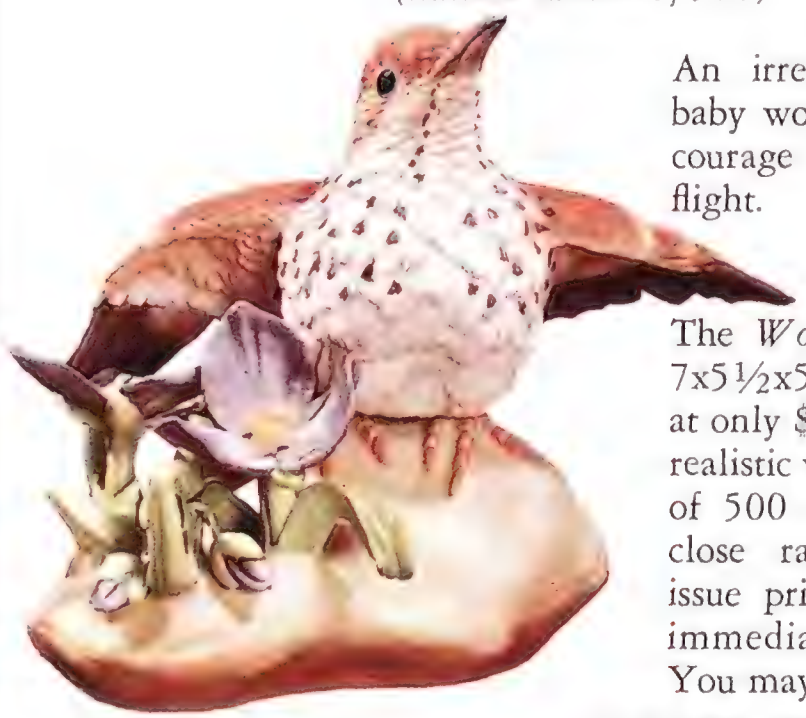

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My request as a sociologist is that we turn away from empty figures toward fuller reflections based upon the social content of such interactions as homicides. Having just completed a study of homicides in Detroit, I propose that we ask people to ponder over the reasons that violent deaths increasingly occur among persons who are close friends or members of the same family. We also need to reflect upon such matters as the discrepancies between personal expectations and real potential when we learn that more than 75 percent of the persons involved in homicides (either as perpetrator or victim) are in the lowest socioeconomic segments of our urban population.

G. Marie Wilt
Research Associate
Wayne State University
Detroit, Michigan

Dear Sir: In the item "Total communication," you stated: "The other camp pointed out that deaf children who were taught only lipreading and other oral methods simply didn't learn very much." Please, please don't tell our two oral deaf sons they haven't learned very much. It might discourage them so much they couldn't finish college. (The older is a junior at Utah State; the younger, a freshman at Wabash College.) Their deaf friends who are in various colleges also should not hear this discouraging news.

Edith H. O'Connor
Cambridge, Massachusetts

Hard sell entices the shoplifter

Dear Sir: Because of a long and close relationship with one segment of retailing that is very much concerned with the increase in shoplifting, Patrick Ryan's article was of particular interest to me.

Too bad Ryan didn't quit when he was ahead. His last anecdote about the French mademoiselle who walked into a London emporium naked but for a simple summer dress and left later wearing 10 bras, 20 pairs of pants, 15 dresses and 1 summer coat was a good story when I first heard it some years back.

I am inclined to question whether it ever really happened except in somebody's fertile imagination.

Walter H. T. Raymond
Harpers Ferry, West Virginia

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Phenomena, comment and notes

Preserving Venice with sausages, making a better spearpoint and finding the real stuff in space

Imagine it if you can: 10 billion billion billion fifths of 80-proof Yuletide cheer. That is what astrophysicists have turned up, in fairly dilute form, near the center of the galaxy.

It has been known since 1970 that methanol, or wood alcohol, exists in what used to be thought of as the vast empty stretches of space. And once that discovery was made, scientists virtually lined up at the 36-foot radio telescope of the National Radio Astronomy Observatory at Kitt Peak near Tucson, seeking characteristic wavelengths of the real stuff. To illustrate the importance of this discovery, it is worth noting that it was announced simultaneously by no less than 13 astronomers from six institutions, including the jointly operated Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts.

If the tenuous vapor of ethyl alcohol molecules could be condensed, say the astrophysicists, it could be cleansed of interstellar impurities and made drinkable. Perhaps, with public enthusiasm for space exploration hereby revived, a consortium of U.S. distillers will join up with NASA and eventually place on the market bottles of Old Galaxy (aged for millions of years).

Breathe a sigh of relief

In a quiet piece of astronomical housekeeping, the Center for Astrophysics also announced recently that two objects in

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WINE TALK

by Austin, Nichols

Château Figeac takes its name from St-Emilion but its breed is Pomerol.

Breed. The unique taste characteristics that mark a great wine. For Château Figeac, it means a claret that's closer to Pomerol than St-Emilion.

Located on a gravelly strip of land that extends into Pomerol, its excellent drainage and mineral content give Figeac a tremendous balance and breed. The Figeac vineyard—with its large proportion of Cabernet-Sauvignon grapes—produces a dark, ruby-black claret that is unique to St-Emilion.

Recognizing and assessing the breed of a wine takes the ability of an expert. Perhaps a more convenient way is to recognize the mark of Austin, Nichols.

the solar system that were previously lost have been rediscovered, thanks to the efforts of observers at the center's Agassiz station north of Boston. Two asteroids, Ra (missing since 1953) and Hc (last seen in 1949), have been found—just where predictions said they should be. It is information like that that makes it a bit easier to face the new year with our heads held high.

For art's sake

As virtually every art lover (and all Venetians) know, the great treasures of Venice are deeply threatened: The city is sinking into the sea, partially because the water table has been lowered by the drilling of wells, and the sea level is simultaneously rising. Add to this the frequent high water caused by bad weather and a good deal of the city is often awash.

Plenty of technological solutions have been offered (including the head-on approach of simply damming up the three entrances to the Lagoon of Venice), but no one can agree, it seems, on which solution to choose.

Perhaps the most promising idea has been proposed by a rubber-tire-manufacturing concern called Pirelli which, in league with a local construction firm called Furlanis, proposes to build three huge rubberized sausages which would be strung across the entrances to the lagoon. Deflated, they would rest on the bottom, thus not interfering with either shipping or the view. But when bad weather is in the offing, high-speed pumps would inflate the sausages with water and they would rise to the surface, forming a temporary barrier against high water.

One disadvantage, however, is that it is primarily during bad weather that the lagoon is flushed out, so local health authorities are raising a fuss about the sausage idea, which prompted *New Scientist* to report the cynics' view of the entire situation—that the water will keep on rising "until the last of the dissident voices has been drowned by the flood."

Canadian mayhem

Doubtless, the most notable Canadian export to the United States is that partially organized form of mayhem known as ice hockey. Blazingly fast and barbarously violent by nature, it is booming here as a spectator sport. But to satisfy

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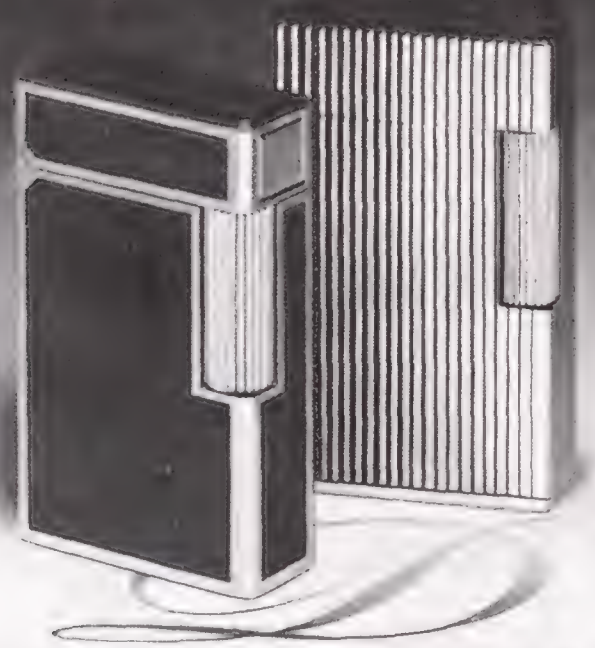

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the bloodlust of a growing number of American spectators requires a growing number of bloodied hockey players and, in a situation that may be unique in these inflationary times, supply is more than meeting demand.

According to an estimate reported in *Medical World News*, there were nearly 30,000 hockey-related accidents treated in U.S. hospital emergency rooms in fiscal 1973, and more than 41,000 the next year. More than a third of these were facial injuries. One 11-year-old boy in suburban Boston "has already suffered eight facial lacerations, including several eyelid slashes." All in all it is fairly clear that, left unchecked, this game could be the greatest mutilator of youth since the Children's Crusade. (Of course, that other pastime, football, is no tea party, either.)

One answer, of course, is face masks for all hockey players, not just goalies, but it's not that simple. The eye doctor of the Toronto Maple Leafs suggests that the use of masks might lead to even more violence. Sophists among mask designers are undecided whether masks should cover the mouth as well as the upper part of the face (seven percent of the estimated 41,000 injuries were mouth injuries). And ultimately the advocates of face masks must overcome the vicarious machismo of the spectators.

Meanwhile, it is a little embarrassing to live in a society that has outlawed combat between chickens in the name of humaneness and encouraged more than 1,000 human eye injuries last year in the name of amusement.

The cleverness of early man

Hunting in prehistoric times was a far more sophisticated piece of work than the popular notion would indicate. Almost

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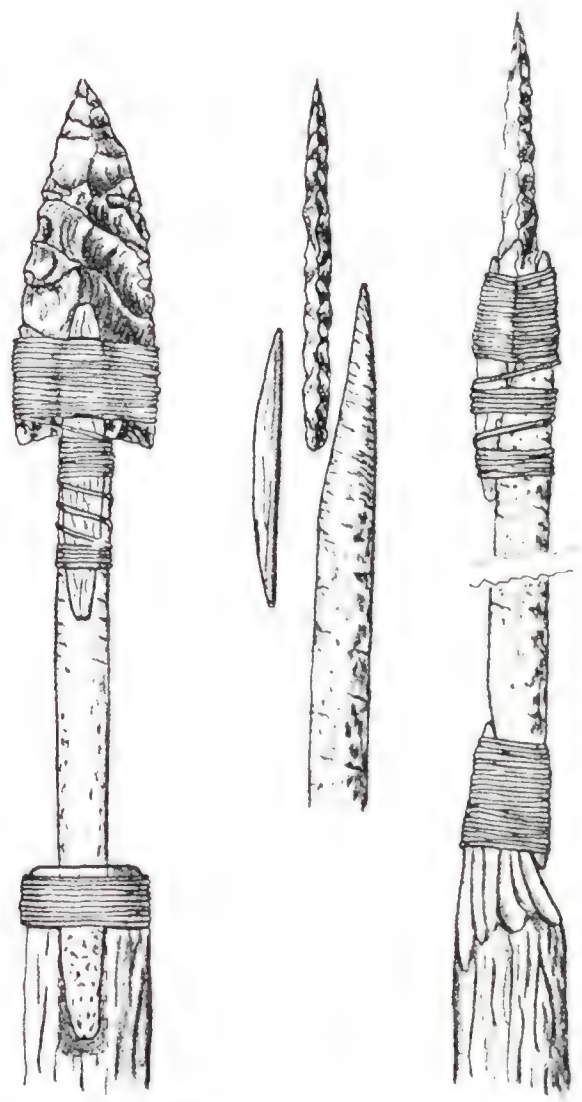
everyone has seen those paintings of heavy-browed cavemen surrounding a hairy mammoth, and marveled at the boldness—or desperation—of the cavemen to take on so monstrous a beast with such puny weapons.

Further thought would suggest that it would take a lot of spears to kill a mammoth—perhaps more than a handful of cavemen could conveniently lug around. A recent piece of archaeological reconstruction by two Canadians, Larry Lahren and Robson Bonnichsen, answers this technical problem and shows that the primitive human inhabitants of North America were not as dim-witted as they are sometimes portrayed.

About 11,000 years ago people lived here who made what we now call Clovis points, named for Clovis, New Mexico. They were fluted blades, a bit like a



Bone shaft affixed to spearpoint gave early Americans edge over mammoths.

bowie knife. Recently, in a find of Clovis artifacts in Montana, some bone rods turned up with beveled ends. The beveled ends were crosshatched and some had the remains on them of what is probably a gluelike resin.

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• An overhead camshaft configuration is a sophisticated design which requires fewer moving parts and allows more precise valve operation than traditional engines. Result: Better durability and smoother performance.

• The transistorized ignition system helps reduce stress and wear on contact breaker points. Result: Better starting performance.

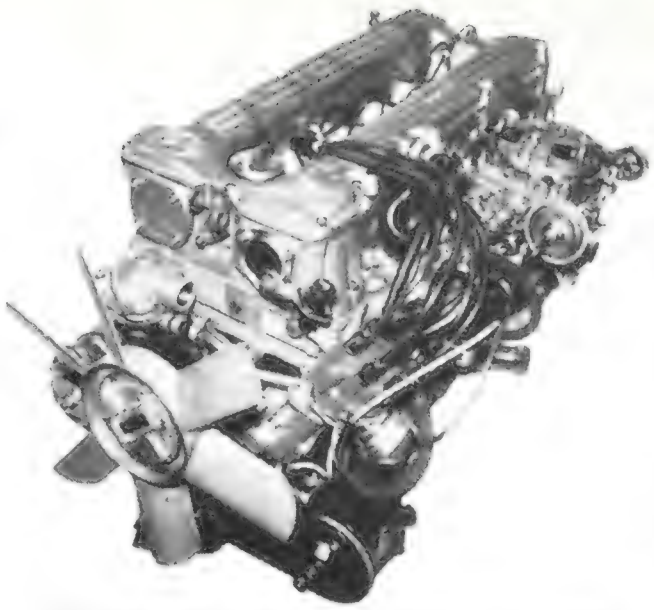
• The compound carburetor provides two-stage optimum fuel/air mixture at all speeds. Result: Good fuel mileage.

This efficient power plant is complemented by a 4-speed automatic transmission with torque converter—and by an aerodynamic silhouette and steel-belted radial tires.

Lessons from a classic

In every detail save power train, the new 280S is the direct descendant of the now classic 450SE Sedans.

The examples abound: Suspension is fully independent. Handling



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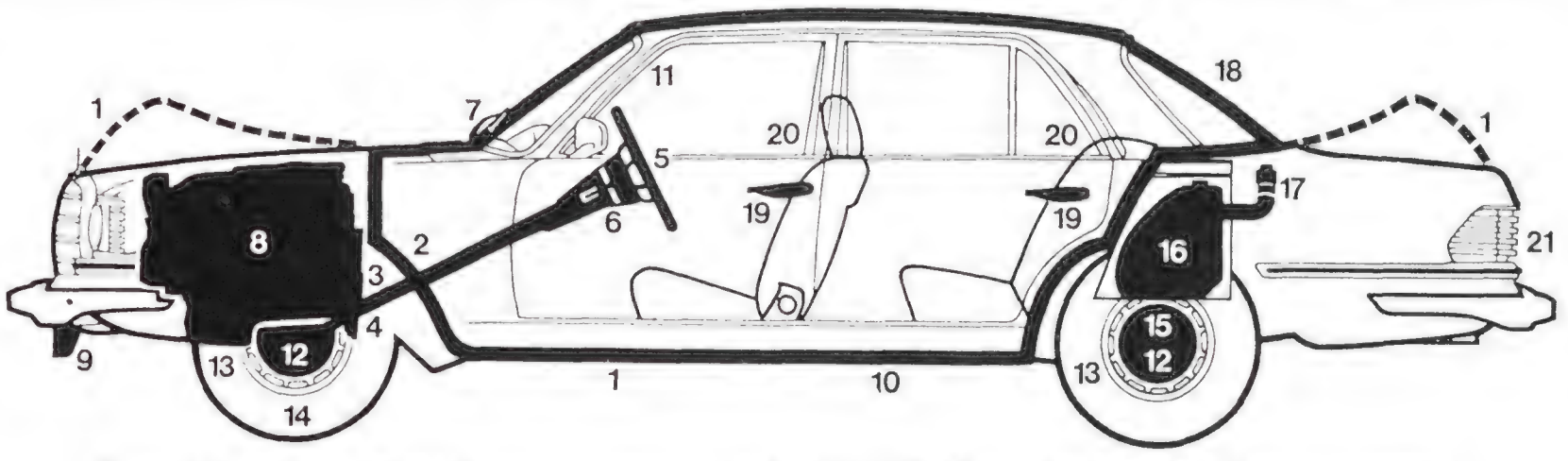

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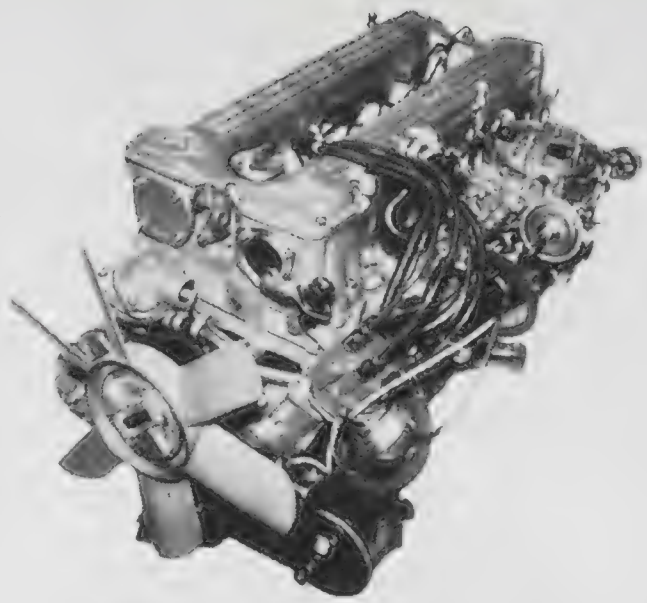

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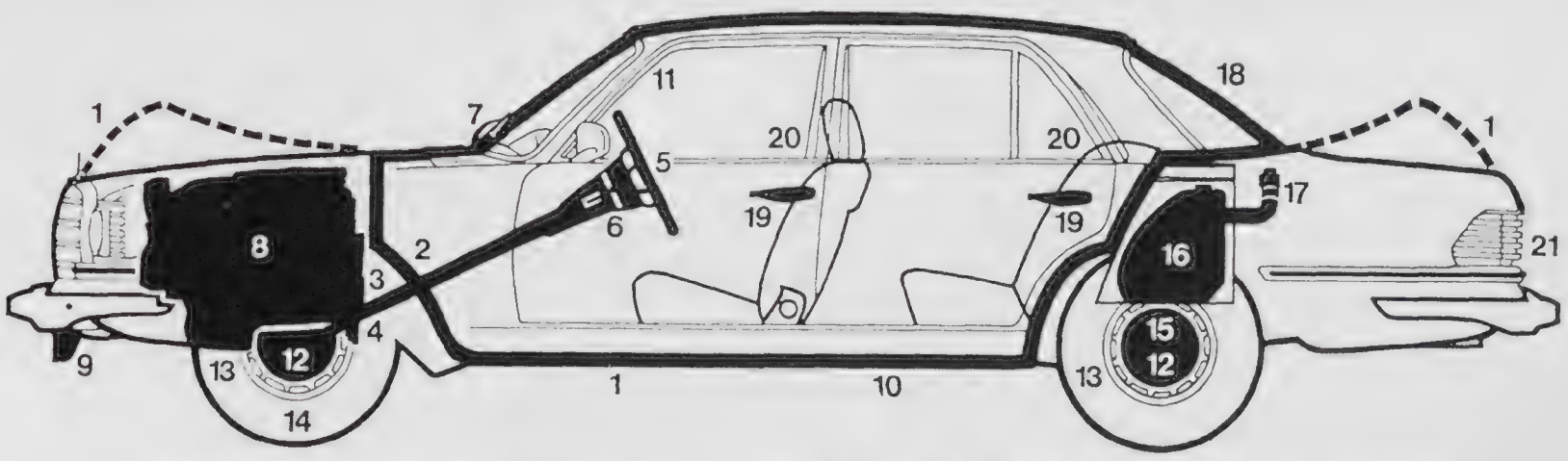

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As usual, the Sons of Liberty get the word—and pass it to Mr. Revere. Off he rides over the treacherous road, leaving his wife Rachel and their newborn son.

He makes for the village of Durham, upstream from Portsmouth, where John Sullivan, recently returned from the Philadelphia Congress where he was a New Hampshire delegate, has been training the militia. Sullivan is a natural soldier, powerful, lionhearted, and he grins in anticipation as he hears out Revere: The redcoats will be coming by sea, any day now, in enough strength to hold the fort for good and all. Whatever Sullivan can do about it, he must do right away. Sullivan can do something, all right. He sends for his fellow delegate, John Langdon, and his militiamen—husky and adventurous youngsters who like to hunt in the New Hampshire forests—and they find some gundalows, the awkward riverboats propelled by both

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We're recycling other forms of aluminum, too. From used Reynolds Wrap® to old utensils, lawn furniture, scrap from industry, etc. Into new aluminum products that cut fuel-energy consumption in automobiles and other transportation equipment. Into building products that save heating and cooling energy.

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sail and oars. On the night of the 13th they move downriver to Portsmouth Harbor, steer for the fort on the marshy shore and, when they run aground, wade through the icy muck to the entrance. "Surrender the fort!" they shout.

Captain John Corcoran, the commander, peers out. He is startled by the sight of a party of sturdy-looking young men, all well armed, standing in the reeds, dripping wet despite the cold. He has only four soldiers with him, totally unprepared for anything like this. And when the captain sees a number of muskets rising to a number of shoulders he does a sensible thing: He surrenders Fort William and Mary.

Sullivan and his men are very happy. They barely feel the cold as they move some 60 muskets, 16 cannon and 100 barrels of powder out of the fort, through the mud and shallow water to the boats—a mighty haul. The bemused Captain Corcoran gets word to Gage, who calls off his coup and writes a letter to the war office.

The New Hampshire patriots find the perfect place to hide much of their booty —in a hole right under the pulpit of the meetinghouse back in Durham.

It's a good hiding place, but anyone listening to the fiery stuff that goes on overhead on an average Sunday might well worry about spontaneous combustion. For although the brimstone images of the Great Revival have cooled off over the past generation, there is still a fair bit of warmth. Jonathan Edwards' description of the souls of the damned twitching and shriveling in hell like spiders held over a flame is no longer reiterated in everyday Congregationalist churches (which most obviously bear the Puritan heritage), but Edwards and his followers and their concept of heaven as a place only for the elect are all too un-

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easily remembered. Whether the concept is right or wrong, few people feel extraordinarily confident about their hereafters.

Church, then, remains an inexorable duty. Attendance may have little to do with predestined achievement of heaven, but it can't hurt. And it's just possible that a daylong haranguing from the pulpit, broken only by a highly caloric meal in the Nooning House, and a chance to refurbish the coals in the portable brazier that you take back to your "piu," will help your chances On High.

As Christmas approaches, the New England Congregationalists, of course, pay no attention. They think of it as "wanton" and "bacchanalian," and though they may recognize the birthday of their Savior in the privacy of their homes, they carry on their jobs and public duties the same as ever. Farther south, Anglican settlements mark Christmas as the English do, as a feasting day.

However they mark Christmas, Protestant groups share certain instinctive feelings about an individual's direct association with God. Most conceive of no other truly compelling loyalty—and that goes for monarchs. So to the largely Protestant Americans, the idea of joining what is already being labeled an "American Revolution" is not only understandable, but even morally desirable.

Such virtue has a price. On the first of this month, all imports from Britain are cut off, in compliance with the decree of the Continental Congress. And following the mood of austerity, many churches call on a return to certain Puritan values —a ban on gaming and roistering and frivolities.

Yet Americans feel greater religious freedom than they would enjoy in Europe. This is worth keeping, whether you are a Quaker, a Huguenot, a Presbyterian or one of the new Shakers. You may quarrel among yourselves—the story is told of the Quaker who was ejected from the Presbyterian home of his loved one, and told her that "I will give up my religion and thee shall thine, and we will go over to the Church of England, and go to the Devil together"—but each guards his freedom.

The Englishmen who are arriving in increasing numbers these days to bolster General Gage's command in Boston have little time for such liberal nonsense. One officer's letter from the garrison town is read in England this month, and it gives a glimpse of one man's America: "The inhabitants of this province retain the religious and civil principles brought over by their forefathers in the reign of King Charles I; and are at least a hundred years behindhand with the people of England in every refinement.

"With the most austere show of devotion, they are destitute of every principle of religion or common honesty, and are reckoned the most arrant cheats and hypocrites on the whole continent of America. The women are very handsome, but like old Mother Eve, very frail. Our camp has been as well supplied in that way since we have been on Boston Common, as if our tents were pitched on Blackheath."

And what is this officer's summation of British chances in a confrontation with these lying, cheating, mealymouthed whoresons? "Believe me, any two regiments here ought to be decimated if they did not beat in the field the whole force of the Massachusetts Province."

EDWARDS PARK

Next month: Friends in Parliament

YOU HAVEN'T TASTED SPAGHETTI UNTIL YOU'VE HAD IT COOKED IN A PAPER BAG.

Unless you've been to the Trattoria di Ciccio in Amalfi, you don't know how spaghetti should taste.

First, Ciccio makes a sauce with clams and olives. Next, he boils some spaghetti. Then he puts both things into a paper bag, folds it shut and heats it in an oven.

What comes out of that paper bag isn't just spaghetti with sauce on it. But spaghetti with sauce in it.

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Getting offshore

It takes time.
The Exxon gasoline you're filling up with today may have come from an oil field we started looking for 8 years ago.

Geological survey. Eight years ago, Exxon began to explore a piece of acreage 75 miles out in the Gulf of Mexico.

Our geologists examined rocks from the bottom of the Gulf and along the shoreline. They used special devices to locate possible oil-bearing rock thousands of feet below the seafloor.

From this information, they created a vertical "picture" of the rock layers to find strata that looked promising.

These studies can take very little time, or up to six years. This one took four.

In 1970, convinced that the chances of finding oil were good, Exxon bought the rights to drill exploratory wells. This was the only way we'd find out for sure if there really was oil there.

Exploratory drilling. We started drilling for oil in mid-1971. To do it, we used a mobile drilling rig. The cost of leasing and operating this rig was $24,500 a day.

Working round the clock, it took us 25 days to drill the first well. It was 8,500 feet deep—and we discovered gas, but no oil.

We then drilled a second hole. This time, we hit oil. To find out how big the field was, we drilled several more wells. They outlined the size of the field and confirmed that oil was down there in commercial quantities.

Exploratory drilling can often take as long as five years. We were lucky. It had taken us just two.

The next step was to design and construct the oil-producing platforms which would replace the mobile rig. These huge platforms would be anchored to the seafloor directly over the field.

Platform construction and installation. We started building the twin drilling and production platforms in 1972. Construction took 16 months.

Each offshore platform has to be built specifically for the area it will work in. We have to take into account water depths, wind and wave action, earthquake possibilities, and other factors. This is why a platform built for the relatively calm Gulf will be different from one built for the fierce North Sea.

Our next step was to tow the steel structures out into the Gulf. We then sank them in place in 235 feet of water, and anchored them with pilings driven into the seafloor.

Then we added the platform decks. These included the crew's quarters as well as facilities for producing the oil.

oil to you.

Production drilling. When everything was shipshape on the platform in early 1973, we began to drill the first production well that would actually bring the oil to the surface. We drilled four wells in 1973, and seven more in 1974.

Most of the wells are drilled straight down for a few hundred feet, then slanted away from the platform base. This greatly increases the area that can be tapped from one platform.

Frequently, we use several platforms in developing an oil field. These platforms, like the individual wells, must be placed carefully to insure that the oil is recovered as efficiently as possible.

Underwater pipelaying. While the platform crew was drilling the production wells, bargemen and welders were busy laying the underwater pipeline that would take the oil from the platform to shore.

Aboard a pipelaying barge, coated sections of pipe move along a track and are welded together. Then the welds are inspected by X rays. The joints are given the same protective coating as the pipe and the continuous pipe is slipped down onto the seafloor.

To get the oil to shore from our new producing platform, we had to lay a section of pipeline that linked our platform with a main pipeline nearby. If this main artery had not existed, and we had to lay one, then the entire pipelaying job might have taken several months. As it was, we did it in one month.

Refining and delivering to you. The crude oil that started coming to shore this year from our production platform in the Gulf was carried by another pipeline to a nearby Exxon refinery.

Gasoline made from this crude was shipped to Exxon service stations through product pipelines and by tank trucks.

And the gasoline you're filling up with today may have come from that field we started looking for eight years ago.

U.S. offshore oil now supplies 11% of America's needs. Within ten years it will have to supply considerably more.

This is why Exxon is looking today for the oil you'll be needing in the 1980's.

EXXON

Opposite: A helicopter lifts Henry Moore's *King and Queen* from the Hirshhorn grounds in Connecticut.

Above: Safely arrived in Washington, it is lowered by crane into position in the Sculpture Garden.

By Russell Lynes (first of two articles)

Modern art arrives on the Mall in a new museum and sculpture garden

The Smithsonian's latest addition—the Hirshhorn—with some 6,000 works of art, is open. Herewith, a look at the sculpture

*Mr. Lynes, a long-time observer and chronicler of the American cultural scene, is the author of—among many other books—*Good Old Modern, *a history of the Museum of Modern Art, New York.*

Photographs by Yale Joel

Modern art arrives on the Mall

The richness of the collection is apparent in this view of the sunken Sculpture Garden on the Mall: in right foreground, Rodin's *Monument to Balzac*;

At the opening ceremonies of the Hirshhorn Museum and Sculpture Garden, Secretary Ripley of the Smithsonian Institution, within whose embrace the brand new museum on the Mall in Washington is enveloped, said of the building: "If it were not controversial in almost every way, it would hardly qualify as a place to house contemporary art."

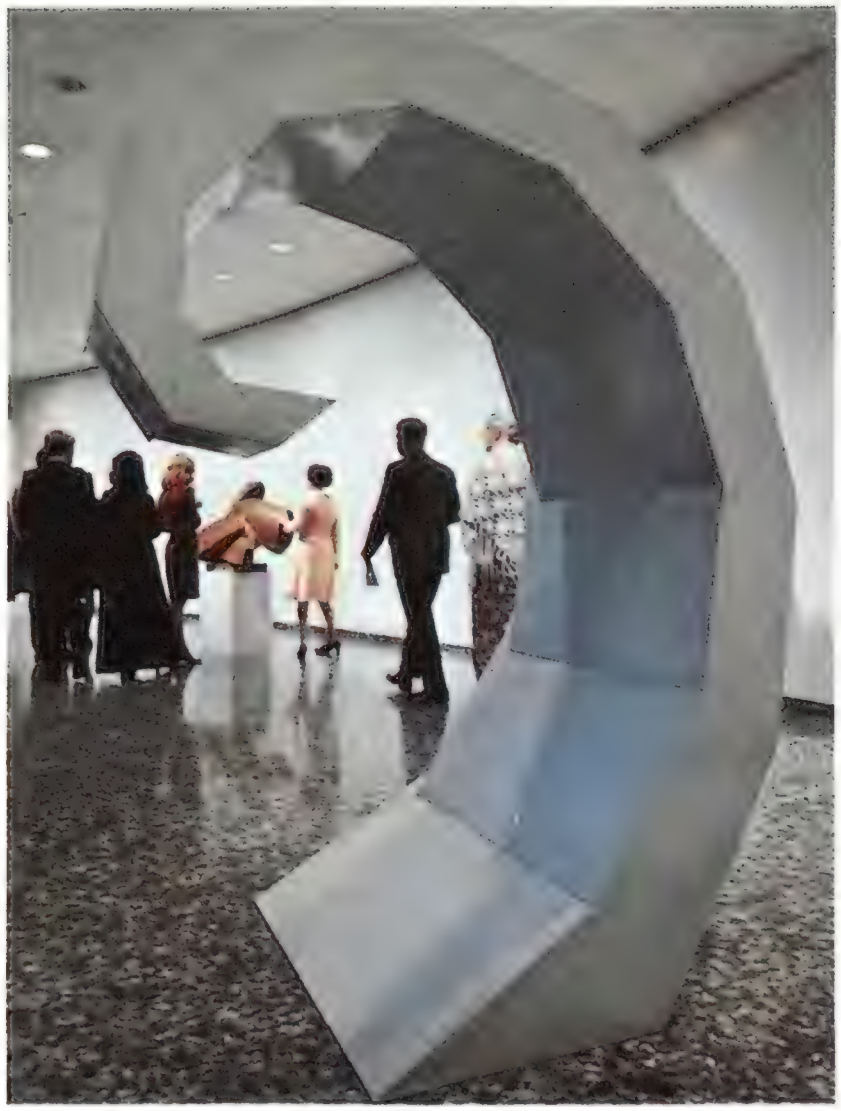
The building has, indeed, prompted more grouchy epithets than any museum building since the intensely controversial (and now much beloved) Museum of Modern Art opened in New York in 1939. The Modern was called "flat-chested," "vacuous" and "Mesopotamian" by the architectural pundits of that day. The Hirshhorn in its turn has acquired a host of cheerfully wicked nicknames. It is "The Doughnut," "The Bunker," "The Mighty Life Saver," "The Pillbox." A visiting New Yorker on opening night said, "It isn't a doughnut, it's a bagel."

There is, to be sure, more than a little visual justification for these nicknames. The new museum is a circular structure of an energetic simplicity. It is surfaced with concrete aggregate, because the skin of marble that was originally planned for it had to be abandoned for reasons of economy. It is without exterior windows, except for a balcony on the side (if a circle can have sides) that looks out over the Sculpture Garden to the dome of the National Gallery and thence to the Capitol in one direction, and down past the exuberant dark-red towers of the Smithsonian "Castle" to the Washington Monument in another. One can, I think, be quite certain that the building, which is an extremely agreeable place in which to look at works of art, will eventually settle down as a congenial member of that wholly eclectic family of buildings on the Mall. When the Castle, in which so many people now delight, fashion having reclaimed it, was being built, the sculptor Horatio Greenough, who liked things functional, said: "There is a certain mystery about those towers and steep belfries that makes me uneasy. This is a practical land. They must be for something. Is no coup d'état lurking there?"

There is no coup d'état lurking in the new Hirshhorn Museum and Sculpture Garden, but there is plenty of esthetic dynamite. It is a characteristic of art that it is capable of exploding every time it is looked at, that the only cap that is needed to set it off is an inquisitive eye. Joseph Hirshhorn has not only an inquisitive eye but an acquisitive one as well, and the vast collection of more than 6,000 paintings and sculptures which he has given the nation has a richness, variety and idiosyncrasy that reflects a passion for art which is fully as explosive as the man who amassed it.

Joseph Herman Hirshhorn, who arrived in 1905 at the age of six from a small city in Latvia with his widowed mother (he was the 12th of 13 children) and settled in Brooklyn, started buying art of a sort that was a far cry from what is in the museum's opening exhibition. He lived as a child on the fine edge of near starvation; his mother supported her family by sewing

in the middle, Maillol's *Nymph*; to the left of it, the big group of Rodin's *Burghers of Calais*; and at the end of the pool, Lipschitz' totemlike *Figure*.



The late Robert Smithson's *Gyrostasis*, a "standing triangulated spiral" in painted steel, echoes the curving walls of the museum's inner galleries.

handbags for 12 hours a day, six days a week, and earned $2 a day. Joe was a child of enormous energy, determined to rid himself of the bitter taste of poverty. He was not, however, one to turn his back on the traditions in which he was reared, and they included the belief that the talented and learned members of the community—the doctors, the artists, the writers and the actors in the Yiddish theater—were to be looked upon with a respect that approached awe. Any man or woman with the gift of art was, he believed, precious. His own talents were not for making things but for acquiring them. By the time he was aged 17, with a capital of $255 that he had earned as an office boy, he set himself up as a broker on the Curb Market (now the American Stock Exchange) in New York. By the time he was 28, he was making $2 million a year as a broker's broker, and he had the prescience to pull out before the 1929 crash.

The first art he bought was what he had learned to love from the calendars that decorated his walls as a child: He bought a large canvas by Sir Edwin Landseer of a dog with soulful eyes and a Madonna with lilies by one of the slickest of all 19th-century French academicians, the egregious Adolphe Bouguereau.

Aline Saarinen in an affectionate profile called Hirshhorn a "little man in a big hurry." He is, and his acquisition of art has been and still is precisely that. He did not, once he got into stride in the late Thirties and early Forties, buy the way most collectors do—a piece at a time, carefully prayed over, analyzed, weighed, tested in some cases on one's own walls, the final decision subtly but deeply influenced by the suave malarkey of a dealer. He trusted his own immediate judgment, his gut reactions and the acuity of his eye, and he plunged with the same sureness that he plunged in business. He had an eye for a good esthetic gamble as confident as the eye that spotted the kind of business gamble that ran his fortune to well over $100 million. He bought not just single works of art when he escaped from his office into a gallery; on occasion he bought five or six—or more—at a time. It was never his intention to make money out of art. Money, in his view, was to be made out of money, and his final fortune (he has made more than one) was the one that gave him his nickname, "the Uranium King."

On the unseasonably chilly evening on which the

Hirshhorn Museum and Sculpture Garden officially opened, a formally dressed crowd of 2,500 people sat or stood around the wide bronze fountain in the circular court of the museum with one bright star peering down on them, a sort of beauty spot on the smooth dark cheek of the night sky. They learned from the speeches that "The Hirshhorn" fulfilled a decree of Congress in 1938 that there should one day be a museum of modern arts on the Mall to complement the National Gallery of Art, that the collection had been wooed by the governments of Canada and England and by the cities of Zurich, Tel Aviv and Florence, and that it was President Johnson, with a nudge from Mrs. Johnson, who had sponsored the gift of the collection to the nation in 1966.

They also listened to Mr. Hirshhorn, who stood on a case of champagne so that he could reach the microphone on the lectern (he is not in the least self-conscious about his small stature; indeed, he appears to enjoy it). He said, "This is a day to remember, the proudest day of my life." There was an electric sense of affection for him in the gathering which stood in his honor.

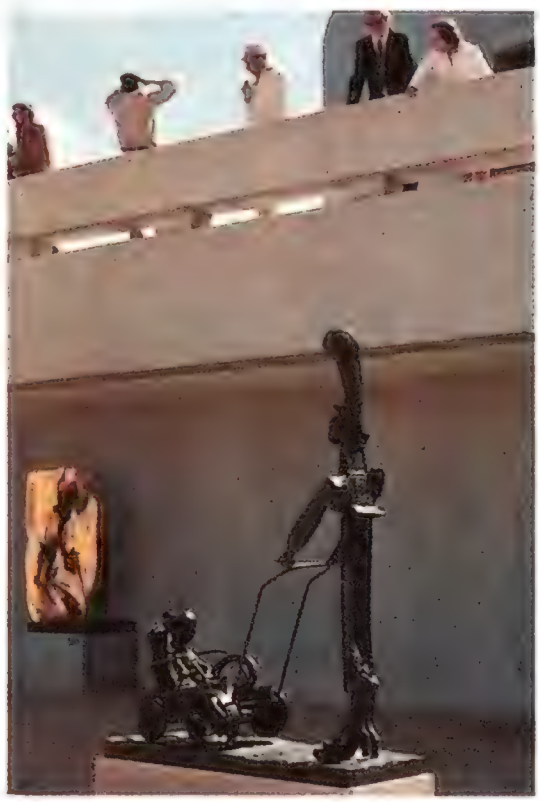
After the official ceremonies were over, crowds poured into the galleries—the ones on the inner rings, filled with small sculptures, that look down on the fountain (see cover), and the outer, windowless rings with paintings. As is characteristic of such occasions, more people looked at other people than at art. Some strolled through the tunnel under Jefferson Drive, which runs past the museum on the Mall side, to the sunken Sculpture Garden; some circled the building to see the sculptures spotted about the plaza; some, including Hirshhorn and his wife, danced by the fountain to an orchestra; some drank champagne and ate strawberries. This was the evening for Members of Congress and Supreme Court Justices, for the movers and shakers of official Washington. The next evening there was another opening for artists, collectors, curators, critics—the citizens of the art world. The third evening there were two parties for the Smithsonian Associates, and roughly 10,000 of them came.

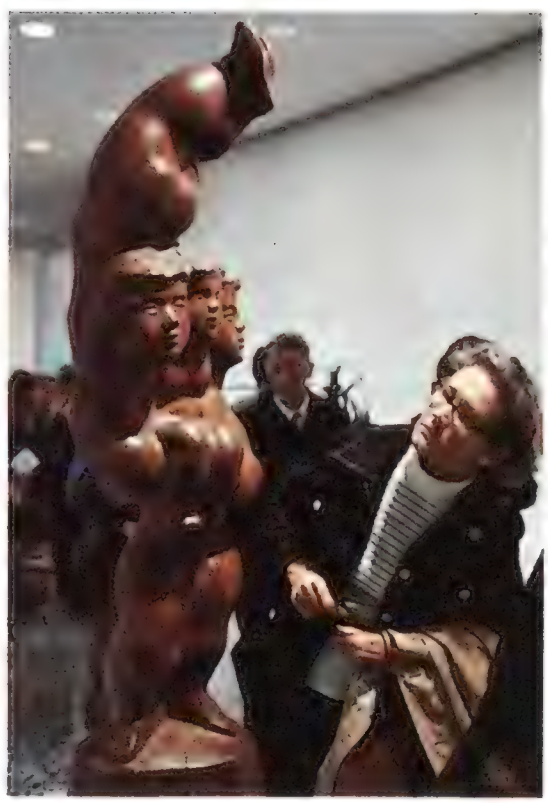
What these people saw, besides each other, were more than 800 works of art dating from the late 18th century to the present, with by all odds the greater number created within the last 60 years. It was a Lucullan feast that should be nibbled at a bit at a time. Let's first taste the cream of the sculpture, and next month return to sample the painting collection.

Although the sculpture in the Hirshhorn is essen-

Attenuated *Tall Figure,* one of 15 Giacomettis in the exhibition, calmly surveys the Sculpture Garden.

Bemused visitors study Rodin's gravity-defying *Iris, Messenger of the Gods* in one of the ambulatories, as windowed inner rings are called.





Impromptu picnic in Sculpture Garden includes real-life counterparts of Picasso's *Woman with Baby Carriage* (center), assembled from "found objects" such as pipes and stove lids, before being cast in bronze. Right: Chaim Gross' *Playful Sisters (Family of Three)* in Mexican tulipwood.

Henri Matisse's four *Backs*, 1909 to 1930, progress from relatively realistic to powerfully abstract.

tially modern, assuming as one must that modern sculpture came to life at the hands of Rodin in the 1870s, there are a few pieces in the collection that go back to the late 18th century. To all intents and purposes France had a corner on talented sculptors in the days of our Revolution and theirs. When, for example, the State of Virginia wanted a statue of George Washington for its capitol, it was the Parisian Jean-Antoine Houdon who got the commission. There are two excellent heads by Houdon in the opening exhibition, one of his bright-eyed little daughter, Sabine, and one of the distinguished naturalist Georges Louis Leclerc, Comte de Buffon, who is credited with anticipating theories later developed by Charles Darwin. There are two small terra-cotta groups of *Satyrs* by Clodion, essentially table ornaments, a charming bronze Venus stepping into her bath by Allegrain and four romantic heads by Carpeaux. There is no American sculpture from the early part of the 19th century (very little was made) and just one "ideal" bust by Hiram Powers, whose *Greek Slave* (1843) was the most famous and certainly the most overrated piece of American sculpture in the 19th century. But these are merely hors d'oeuvres for the incredibly hearty banquet that is the Hirshhorn sculpture collection.

Sculpture had come to a pretty pass before Rodin rescued it. The dead hand of misunderstood classicism had both private and public patronage in its grip, and it was Rodin who broke it with sheer virtuosity, gall, and power of character and made himself accepted by the academicians. "Sculpture is the art of the hole and the lump," he wrote, "not the straightness of smooth faces without modeling. . . . The public, which has been perverted by academical prejudices, confounds art with neatness or spruceness."

There were two French artists who anticipated Rodin's break with what officially passed as sculpture, and neither of them thought of himself as a sculptor. Daumier and Degas made small pieces for no one but themselves and both worked in wax or clay. These pieces stayed in their fragile original materials until after the artists had died, when bronze castings were made of them in the 1920s and '30s. Daumier's little figures and caricature heads, of which there are two dozen in the exhibition, were evidently working models for lithographs to be published in a satirical magazine to which he frequently contributed. The heads are devastating caricatures; the full-length figures are genre figures, both humorous and sharp. The little Degas bronzes, one of a horse, several of dancers, and some of women bathing and arranging their hair (the artist's frequent subjects for his oils and pastels), are studies of poised action, small miracles of three-dimensional draftsmanship by one of the greatest draftsmen of the 19th century.

The Hirshhorn Rodins (there are 13 of them on display) range chronologically from the rather formal *Mask of the Man with a Broken Nose,* modeled when he was in his mid-twenties, to a portrait, left unfinished at his death, of Etienne Clémentel, a close friend in his

Another Matisse progression, the five *Heads of Jeannette*, 1910-13, begins with the head at right.

later years who saw to it that a Rodin museum was established in Paris by the sculptor's will. Every facet of this many-faceted genius appears to be represented —the romantic, the monumental, the anecdotal, the melodramatic, as in the formidable six figures of *The Burghers of Calais* (see August SMITHSONIAN), where drama skirts along the edge of sentimentality without quite falling in. He is both an impressionist and an expressionist, a dissector of light and of emotion. Every surface seems to be in motion, whether it is in a small bronze such as *She Who Was Once the Helmet-maker's Beautiful Wife* (or, in the more economical French, *Celle qui fut la belle heaulmière*), the desiccated wreck of a once-beautiful body, or the monumental *Walking Man* that stands almost seven feet tall. There is no way to judge Rodin against Rodin except by carrying a mental image from one piece to another: The big ones are in the Sculpture Garden, the small ones are variously scattered through the ambulatories, as the inner, windowed galleries of the building are called.

It is possible, however, to measure him against his contemporaries, to walk from his *Burghers* and *Walking Man* to Emile-Antoine Bourdelle's *The Great Warrior of Montauban* in the garden, or from his *Iris, Messenger of the Gods* (p. 39) to the little bronzes of Degas. (*Iris* seems to be a fanciful name for a dancer holding her right foot in a quite different manner from a Degas dancer similarly engaged.) Indeed, there seem to be as many sculptures by 19th-century artists that one thinks of primarily as painters as there are by sculptors. There is a brassy little Gérôme, a nude female called *"Boules" Player* (out of uniform, one might say) as slick and anecdotal as his paintings of Algerian slave markets, two Gauguins in which he discovers in bronze the torso of a Tahitian woman and the face of another in a manner very different from his paintings and very different from his better known and more totemic sculptures. There are five Renoir bronzes, two of them reliefs, that have the same affectionate, sensuous and solid qualities of flesh as his paintings have. All of them were done in his later years when his hands would no longer respond to the dictates of his mind, and they were executed under his supervision by an assistant. Though they were made in the early years of this century, they are children of the last century without question.

As one wanders through the ambulatories with their free-standing pieces on white pedestals and smaller objects in glass cases, and then through the Sculpture Garden with its several levels, its pool, its massive bronzes and stones, figurative and abstract, and the constructions of metal, stationary and in motion, the variety and density of the collection is very nearly overwhelming. (One wishes that nature had been given a better chance to serve man-made objects, but it eventually will. There are some "instant" trees and shrubs and hedges, but they do too little to relieve an unfortunate spare look that is unsympathetic to the sculpture.) There seems to be a kind of unity in spite

The sophisticated couple above are Elie Nadelman's *Hostess* and *Host*, carved around 1920. The figures are painted cherry wood and the chair iron.

Three visitors make a sculptural group of their own amid *César's Thumb*, Larry Rivers' painting *The Greatest Homosexual*, and George Segal's *Bus Riders*.

of the variety, and it is a unity of quality—not of style or intention, and most certainly not of methods.

There is an almost audible change in the tone of voice of sculpture at the turn of the century. Much of the painterly quality of Rodin and those he directly influenced disappears in the cool, classical simplicity of the figures of Maillol, who stands astride the 19th and 20th centuries like a giant. Whereas Rodin explored the complexity of surfaces, Maillol sought to simplify them. "One must synthesize," he said. "We live in an epoch in which a great many things need to be synthesized. I should make better Egyptian sculpture than modern, and better gods than men." There are five of his "goddesses" in the collection, one just 10½ inches high, one just over five feet.

Three of Maillol's somewhat younger and greatly gifted contemporaries (Maillol died in 1944 at the age of 83) embarked on such entirely individual ways to create simplified forms of the human body that it is difficult to equate them. Wilhelm Lehmbruck drew them out; Gaston Lachaise blew them up; Elie Nadelman reduced them to mannequins—all poetic, rhythmical and solid. Each of them is in the collection, but the edge in the quality and importance of the pieces exhibited belongs to Lachaise, who is represented at the top of his form.

After 1900 sculpture took off in so many directions that it is impossible in this space to give even an elliptical outline of its progression. There is no tidy line from figurative sculpture to abstract; the lines are intertwined and overlapping. There is scarcely a sculptor who pushed the art in any important direc-

tion who is not included in the Hirshhorn collection, or whose work is not reproduced in the impressive catalog (almost the exact dimensions of the Manhattan telephone directory) of the opening exhibition with its 290 color plates and 729 black-and-whites, excellent texts by six reliable art historians, and remarkably copious documentation by the staff. Even to skim is to find oneself in a delightful but confusing maze of names and styles and materials. Let me mention just some of Hirshhorn's cream.

There is an extraordinary group of bronzes by Henri Matisse which includes the five *Heads of Jeannette* (p. 41), a very early piece called *The Serf* which is a tribute to Rodin and owes much to him, and four large reliefs of the backs of women now placed outdoors against the wall of the Sculpture Garden (p. 40); they date from 1909 to 1930 and become increasingly simplified and monumental as they progress. In all, this must be one of the greatest collections of Matisse's sculpture anywhere.

His contemporary, Picasso, whose sculptural style no more stood still than his styles of painting, is here in many guises, from his early heads (also under Rodin's influence) to his exercises in three-dimensional cubism, to a marvelous construction of *objets trouvés,* called *Woman with a Baby Carriage* (p. 39), and to the poetic and monumental *Pregnant Woman.* There are 14 Picassos in all.

There are four Epsteins—two smashing portraits, including the one of Joseph Conrad, and his famous *Visitation,* which is set in one of the arches of the outer ring of the building, and an early pair of atypical

marble doves. There is what can most accurately be called a poetical flight of Giacomettis, 15 of them, some of them exhibited along with paintings in the galleries. There are Marino Marini's little men on desperate horses, Manzù's work in depth, mostly religious subjects (including the *Monumental Standing Cardinal* which, when the sculpture was being lifted from the Hirshhorn garden in Greenwich, Connecticut, by helicopter, started to spin on its cable like a top and made everyone who saw it gasp). There are an even dozen of his works. Compared with Picasso he is sentimental; compared with Lipschitz, of which there are absolutely first-quality pieces in both the garden and the ambulatory, he is soft and charming. It would be almost impossible to improve on the quality of the Hirshhorn Lipschitz collection, though only seven pieces are shown. Heaven knows what is in the vast sculpture storage area below the plaza—heaven and Abram Lerner, that is, the director of the museum who has worked with the collection for years and planned and mounted this inaugural exhibition.

Brancusi, who did more than any sculptor to clear the way for the abstract work of our own day, could be better represented than he is in the current show. He was, as one critic called him, "a purifier." He cleared the air of emotionalism, of fussy surfaces, of heroics and sentiment and got to the simple-seeming but highly complex matter of pure form out of which came the work of such disparate artists as Noguchi and Gabo, Arp and Hepworth, Miró and Moore, Calder and David Smith, and dozens of lesser ones.

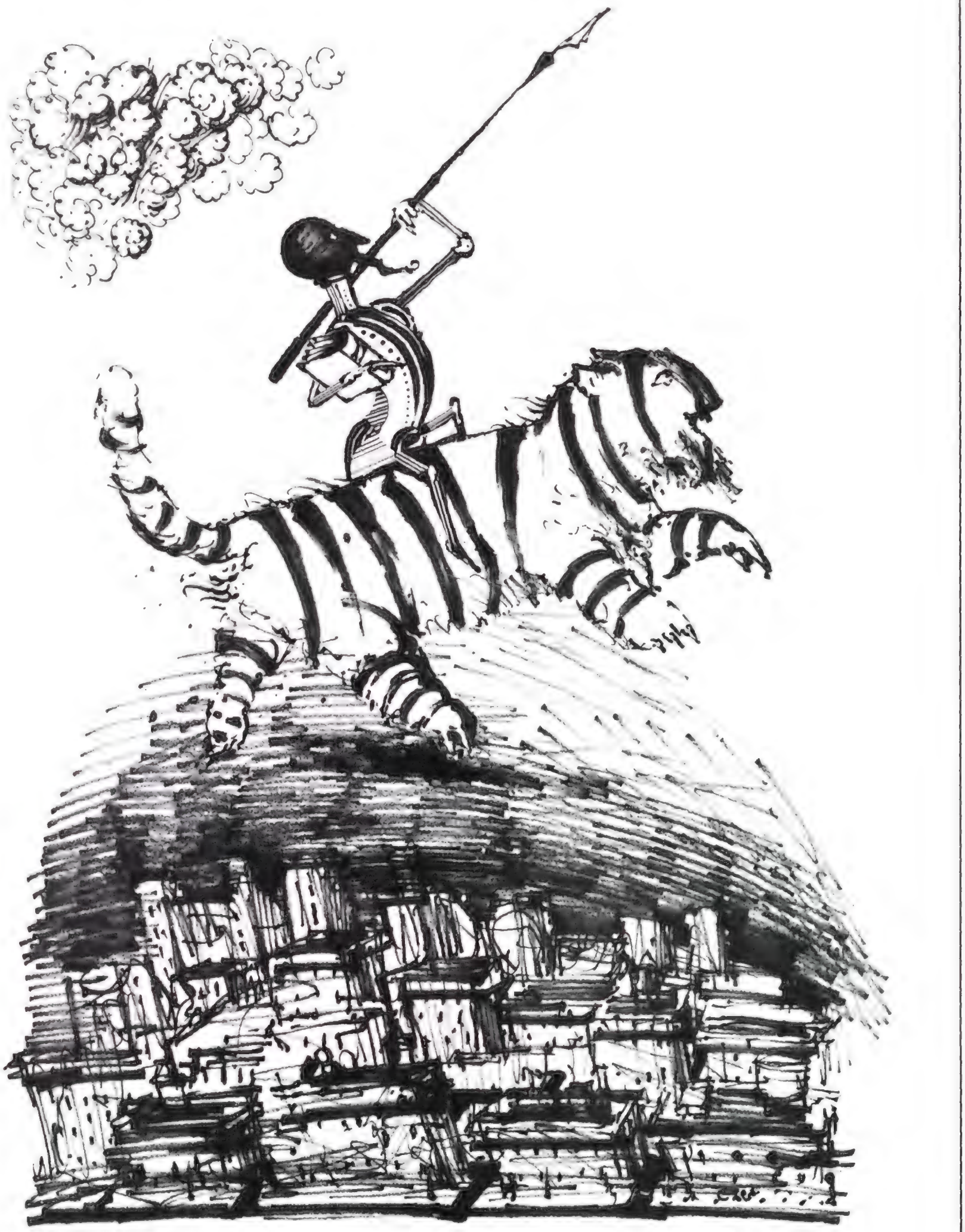
Take these last three—Moore and Calder and Smith. There are 16 Moores, 10 Calders and 18 Smiths in the exhibition. They are almost exact contemporaries. Moore and Calder were both born in 1898, Smith in 1906. Each added an entirely new dimension to sculpture and none has been successfully imitated. Moore is the quintessential exemplar of "the hole and the lump" with surfaces as smooth as Brancusi and volumes as solid as Maillol. He is sometimes anecdotal as in his *Rocking Chair,* a little bronze less than a foot high. He is sometimes entirely abstract as in his tremendous *Two-Piece Reclining Figure: Points,* which stands outside the entrance to the museum. It was a last-minute gift from Hirshhorn and does not appear in the catalog of the exhibition. There are Calders of almost all sorts, from the early mobiles that hang from the ceiling to a recent tremendous stabile, *Two Discs* (opposite), in the plaza surrounding the building. Smith, who has been called "the greatest sculptor America has produced" (the kind of statement that demands to be challenged), died in 1965 leaving a vast body of work in metal, a medium in which he was a highly proficient craftsman with an extraordinary inventiveness, and an uncompromising sense of urgency and power. It is seen here in full force.

The metaphor of the iceberg has been on everyone's lips who has talked about the Hirshhorn collection. Only a tiny fraction of its vast mass is visible. This description of the collection of sculpture is, you might say, the iceberg's iceberg. It reveals only a tiny fraction of what is visible, as those who are so fortunate as to be able to go and see for themselves will immediately and, I trust, joyously discover.

The opening ceremonies over, Joseph H. Hirshhorn dances with his wife Olga on museum's plaza.

Two indelibly American images, a hundred years apart: the Capitol dome and a Calder stabile.

Next month: a look at the paintings in the collection



Concept of black studies is here envisioned as a black Don Quixote, armed with pen and book, challenging lofty future windmills as he rides a tiger above the halls of academe.

By J. K. Obatala

Black studies stop the shouting and go to work

The flaming issue of the Sixties still glows, but with a growing light of scholarship, not the blaze of rebellious racial rhetoric

Cecil Glenn, wearing voodoo doll, heads black studies at University of Colorado's Denver extension.

Cecil Glenn is a short, muscular man with dark brown skin and closely cropped hair. His huge arms and appearance make him seem somewhat out of place in an academic setting, for he looks more like a nightclub bouncer or a "do-rag" nationalist gone natural than an academic chairman. Nevertheless, Glenn is one of several administrators and department chairmen whom I visited recently in an effort to chart the course along which black studies is developing in this country. His seemingly anomalous presence tends to underscore the alien and antithetical posture of black studies in a hostile academic world.

Glenn, chairman of the Black Education department at the University of Colorado's Denver extension, was caught up in the upheavals of the 1950s protest era and catapulted into one phase of the freedom movement after another. He came to Denver in 1970 and took over the Black Education department when the appointed chairman—a bubu-clad nationalist—was shot and killed in Denver one day before school was to open.

Following the death of Martin Luther King in Memphis on April 4, 1968, hundreds of black studies courses and departments sprang up almost overnight. What was called "the first black studies program at a predominantly white institution of higher learning" was instituted at San Francisco State in 1968. By 1972, according to a *Wall Street Journal* article, half of the nation's 2,578 colleges and universities were offering at least one black studies course and, of these, 182 were offering degrees in the subject.

The rapid growth of black studies on white campuses was made possible by the rapid growth in the number of black students. Both developments were, in turn, by-products of the King assassination.

"Prior to the murder of Dr. King," notes James McGinnis in an article published in *Black World* last year, "racism, money and admissions worked admirably to select a virtually white student body." Acting partly from guilt over King's death and partly from the fear of the "long hot summers" of the late Sixties, white administrators took steps to increase black students on campuses. Between 1960 and 1970, that number more than doubled.

Another factor in this unprecedented increase was the spread of black student unions, a development already in process when King was killed. In earlier phases of the black student movement, these unions contained broad cross sections of black students. The latter were usually organized around a hard core of activists, most of whom had gravitated to the campus from the freedom struggles of the South, or from the urban protest movement which began in northern ghettos during the middle Sixties and spread rapidly—via black and radical white activists—to uni-

versity campuses virtually throughout the country.

Black student unions placed demands upon college and university administrators to increase the number of blacks on campus and to implement black studies. Violence and student unrest over the issues of black studies and "incoming students" flared all across the nation, from San Francisco State in the West to Cornell in the East, from Harvard in the North to "Ole Miss" in the South. Thus the same unsettling winds that swept Cecil Glenn from the Tennessee grasslands also plucked thousands of black American youths from their ghetto enclaves and flung them unannounced into the private chambers of the white academic establishment.

Black studies, then, was a part of the cultural and political baggage brought by the intruders. But now the winds have abated, and in the wake of the storm both intruders and their hosts are having to face up to the problem of what to do about black studies.

"In 1970 I attended a meeting in Philadelphia," notes Glenn, "where there were 207 black studies directors. This past year I attended that same convention . . . in New York and there were only eight of us." This, of course, is an overly dramatic statement of the situation, but it tends to lend credibility to *Newsweek*'s now famous "Report Card on black studies" which cast a dismal forecast for the future of the discipline.

"There is a reason for . . . the decline of black studies programs throughout the country," continues Glenn. "A lot of it is our own fault. A lot of it is the result of the political structure of the university."

The decline in student enrollment and the phasing out of some programs doesn't necessarily mean that black studies is on its way out, or even that it is in trouble. Rather, the present reversal could mean that, for the first time since the 1960s, a healthy balance is being struck. For the political demands that brought black studies into being were always much greater than the academic needs.

It is just such a critical adjustment that is the pivotal point around which any program turns until it has gained the internal cohesion and academic legitimacy that is necessary for survival within a university. If the rationale for black studies is still no more than the need to appease black students, then the decision will be against the department. If the rationale rests upon a recognized need for an academic inquiry into the specialized experiences and problems of Afro-Americans, then the black studies programs will be transferred from "soft money" to "hard money," faculty positions will become tenured and funds for research and travel will be consistently made available.

The critical problem for black studies, then, has been the challenge of making the transition from a political to an academic issue.

At Iowa State University, the transition seems to have been made, largely because the question of black studies was never connected to any appreciable degree with black student or faculty influence. Dr. Edwin Lewis, assistant vice president for curriculum

The author came originally from Georgia and is earning kudos as a California journalist. Mr. Obatala's articles are currently featured on the "Opinion" page of the *Los Angeles Times*.

development, has noted two factors which account for the relative ease with which black studies has grown and developed at Iowa State. One is that there was no demand for a separate black studies department. "If we had created a separate structure," notes Dr. Lewis, "this would have meant siphoning resources out of other departments and there would have been some negative feeling."

The second factor was that "the small number of blacks that we have means that they don't represent a large power structure." Dr. Lewis is careful to note that "if we had had a larger number [of black students] we would have had more pressure, and I can't say that . . . we would have gone the route we did."

Good planning changes hard-nosed viewpoint

Although Iowa State has experienced some serious racial problems, most of the conflict has had to do with student recruitment policies and the social alienation of its fewer than a hundred black students. Northwestern University and the University of Illinois, Chicago Circle, have larger black student constituencies, but have had relatively few problems in developing their programs. However, the reasons for the growth of black studies at Northwestern and the University of Illinois are quite different from those at Iowa State.

For one thing, although the initial demand for black studies at both institutions led to confrontations between students and administrators, the response of administrators at Illinois was such that later conflicts were minimized. Instead of giving in immediately and allocating token resources, the University of Illinois conceded with some reluctance, and then proceeded to develop a well-planned and well-financed program. Dr. Grace Holt, present coordinator of the program, has noted that although the initial demand was put forward in 1968, the program did not begin until 1971. During this interval "the students justified their position by doing their homework," she recalls. Perhaps because of the well-planned manner in which the program was developed, the lukewarm attitude of the administration has grown into one of full acceptance and support.

However, there are two features of black studies at Illinois which should be noted. One is that it began as an interdepartmental program and is only now beginning to assume departmental characteristics. Some of its courses, for example, are cross-listed (offered by other departments for credit), while some are offered only by the black studies program. By offering its courses in other departments, the program did not have to compete with stronger political interests.

The other factor has been time. The program was implemented relatively late (1971), so it was able to benefit from past mistakes.

Portland State students talk with Dean Ronald Cease who felt compelled to halve black studies budget.

The department of African-American studies at Northwestern also started late, but followed a different pattern of growth and development. It began as an independent department with its own faculty. "At some later stage, say in the next two years," explains Dr. Jean Carew, current director of the program, "we are going to start thinking of joint appointments to extend our faculty." Here again, the political implications of academic growth become apparent. Interdepartmentalism is obviously being considered by Carew as a strategy to expand the department while at the same time avoiding conflict with other more politically influential departments.

Carew and Holt operate within large, well-financed institutions which have placed academic excellence over and above the struggle for material resources. Black studies at Portland State University in Oregon has not been so fortunate. It is not only without a chairman, but the budget has been cut from $70,000 to $35,000. Indeed, the very existence of the program seems uncertain. Dr. Ronald C. Cease, dean of undergraduate studies at Portland State, has defended his

actions on grounds of "bad management," "low student enrollment" and "lack of focus" in black studies courses. There is no doubt an element of truth in Dr. Cease's argument. Yet the friction between black studies faculty and university administration—which now involves some students—is probably not totally unrelated to the fact that the department is politically weak at a time when the state has cut the university budget by some $1,000,000.

There are no tenured faculty members in the Portland State department. Significantly, at the time of the cutback, there was increasing pressure by faculty and some students to obtain tenured positions, and also an organized effort to make the department an independent entity. It has been recommended that the name of the department be changed from Black Studies to the North American Institute of African and Black African Studies. (The university administration chose to ignore rather than refuse the request.) It should be pointed out that Portland State has the largest black student population in Oregon, and the city of Portland has the most black citizens.

In the 1970s university administrators no longer feel threatened by student unrest. Most of the students who pioneered the struggle for black studies have graduated. The black student of today remains largely untouched by the great social and moral issues that arose out of the civil rights struggles of the Southeast and swept across the nation during the Fifties and Sixties. The most threatening gesture Glenn Harper and his student followers at Portland State could make at this time was to prepare a class-action suit against the administration.

It is thus not surprising that James McGinnis, writing in *Black World,* complains that "the universities are resuming their old posture towards blacks" because, as he put it, "the political turbulence that ushered in the black students has subsided." Moreover, the externally induced unity which followed white resistance to black civil rights demands and urban riots has largely dissipated. The black studies program at the University of Pittsburgh has 16 faculty positions, making it one of the largest programs in the country, but could not muster the necessary unity to choose its own chairman.

Ann Jones, a black associate professor in Pittsburgh's School of Social Work, was brought in to try to ease the tension until a permanent chairman could be appointed. (The proposed chairman was apparently too militant to suit.) Though Jones was optimistic that the issue would be resolved this year, the "ideological" rift between faculty members in a department this size could mean continuing trouble since there are no powerful activist organizations to force unity.

Stemming, perhaps, from internal dissension is the problem of attrition. Black studies chairmen and faculty members seem not to stay around very long. During my visit, the black studies department at the University of Washington had just appointed a new chairman, Dr. Trevor Chandler. The State University of New York at Buffalo was interviewing candidates; the University of Pittsburgh had a temporary chairman, while Portland State had no chairman at all.

Trevor Chandler, recently appointed black studies chairman at University of Washington, conducts class.

The social role of black studies helps to explain this phenomenon. Black studies was more than just a means of projecting the cultural identity of black students—it was also a means by which blacks could enter the academic job market. Blacks eager to get their foot in the academic door applied for positions in black studies programs with hopes of eventually gaining entrance to more "respectable" departments; or of staying until they could complete their studies and research for graduate degrees. Also, many colleges and universities seem automatically to refer all black applicants to black studies departments, either to avoid considering them for other positions or to hang onto them until other positions open up.

Just before the rise of black "separatism" in the middle Sixties, increasing pressure was being applied to universities by black fraternities and civil rights organizations to hire more blacks as faculty members. Black studies no doubt created a welcome reservoir into which black job applicants could be diverted.

Black studies faculty positions are of a low status and a transitory nature. This largely explains the increasingly significant role played by immigrants as faculty members and administrators. Out of four state colleges and universities in the Los Angeles area, three black studies departments are headed by Africans, one by a West Indian. The black studies department at the University of Washington is also headed by a West Indian, as was that at the State University of New York at Buffalo last year. Jean Carew of Northwestern is from Guyana. Among the departments I visited which have both African and West Indian faculties are Northwestern, the University of Pittsburgh and the University of Washington at Seattle whose chairman, Dr. Chandler, is a West Indian.

While most black studies programs have served as stepping stones to higher positions for Afro-Americans, West Indians and Africans alike, Ibos have been especially astute in their ability to exploit black studies to their own benefit. Stranded in this country during the Nigerian civil war, many Ibos used their positions as administrators to gain residential visas, and probably instigated a great deal of pro-Biafra activity from within black studies departments.

Two additional factors contributed to the growth of African (especially Ibo) and West Indian influence in the black studies movement. One was the willingness of American blacks in the 1960s to accept any dark-skinned person from another country who referred to them as "brothers"—a result of racial tensions in this country and the black attitude that their only hope lay in "forging bonds of brotherhood." Skin color and rhetoric became the main criteria for gaining acceptance among students and militant faculty. The influence of the latter was such that it often determined whose résumé was forwarded to the administration.

Conservatives in liberal clothing

This irrational practice eventually backfired on the student and faculty racialist groups who engaged in it, a development which came to be the second factor contributing to the disproportionate influence of Africans and West Indians in black studies. For the racialist rhetoric and African dress of Ibos and West Indians concealed deep-rooted conservative instincts. While both foreigners and Afro-Americans believed in the system, in spite of their indictments and scathing attacks on it, West Indians and Africans came to this country to partake of capitalism as it is and were not actually that interested in bringing about the kind of reforms that students and some faculty were demanding. They often gave lip service to them. Quick to recognize the advantage offered them by the blind racialism of the nationalists, college administrations began to hire Africans and West Indians en masse as faculty members, chairmen and directors of black studies. Here were chairmen who were not only efficient and relatively cheap, but also politically safe. Also, they satisfied the racialist ideology stipulated by many search committees. They were adept at articulating "blackness" and "pan-African" ideals while, at

the same time, taking a realistic and pragmatic approach in closed-door negotiations with university officials. African and West Indian chairmen and directors helped stabilize black studies departments. Their strict, British-colonial approach to grading also helped check the practice of giving grades to political allies. The foreigners had few commitments and fewer friends among students and community.

Yet African, West Indian and Afro-American administrators and faculty were not able to act soon and decisively enough to check a snowballing effect that had set in by the 1970s—and which affects the image of black studies even today.

The original necessity to grade student activists liberally stemmed from the fact that activists responsible for keeping pressure on university administrations to admit more black students and hire more black faculty simply could not have remained on campus had it not been for "sympathetic grading." This, together with marginally qualified personnel who drifted into departments, seriously damaged the credibility of black studies. Students not familiar with the political origin of this practice have come to expect easy grades. Others expect an ideological approach to subject matter that amounts to a lot of talk but not much work.

But these students are in the minority. In the universities I visited, the type of student who once drifted into black studies classes for ideological reasons and to obtain easy grades is no longer enrolling. Others, because of the past image of black studies, have never enrolled and are reluctant to do so at the present time. So black studies departments now cater to students who came to school primarily to learn. The market is neither unlimited nor new.

If black studies is to compete in the academic marketplace, it must offer products that are not only salable, but useful. First, the dominant role played by history in the black studies curriculum must be brought to an abrupt end. One of the key criticisms of students on every campus I have visited over the past few years has been that black studies contains "too much history." "We want courses that help students to adjust to the real world," complained the black female twins with whom I talked on the campus of the University of Washington. "We would like to study the problems of black doctors or analyze accounting problems in the black community."

Their views are obviously influenced by the fact that one was a premed student while the other was an accounting major. Nevertheless, this is the new clientele to which black studies must cater. Yesterday's black student was seeking emotional release and cultural identity. Today's is seeking intellectual stimulation and, beyond that, a clue to the puzzling question of how to get ahead. He is more interested in how the odds against blacks can be evened than in how they came about.

Certain other realities must also be faced. The purpose of black studies is not "to cater to the needs of the black community." That hollow phrase was generated so that black middle-class students could solicit community support for their otherwise elitist goals. Rather, the purpose of any black studies program is to cater to the needs of the student community, be it black or white. In fact, the needs of a black student may be categorically different from the needs of the community from which he comes. For example, persistent needs of black neighborhoods are jobs, housing, recreational facilities and capital investment. No group of students can provide these. What the student needs is to know where to look and how to take advantage of what he finds. He needs a skill, a trade, a profession or a salable service. What is more, the majority of black graduates, no matter what their emotional commitments are, simply will not return to the black community to work—unless with a white company or a government program that just happens to be located in a black neighborhood.

Whites find new insights

One purpose of black studies should be to provide students with the sense of cultural appreciation and emotional security that they will need in order to function outside the black community. The same course should provide white students with the insights they will need to relate positively and productively to the black community. In a word, black studies should promote integration and not separatism.

Similarly, the notion that black studies should be used as some kind of revolutionary tool must also be

abandoned. The truth is that black studies is not, never was, and cannot be "revolutionary." The nature of black studies should not be confused with the rhetoric that was used to mobilize support for various black programs.

The American melting pot is still simmering, however slowly, however imperceptibly. The fact that its cultural ingredients seem to be much more soluble than its political and economic components, gives perennial rise to the stench of racial discord, but that does not mean that the pot is not boiling. In fact, the middle-class basis of the black studies movement is impressive evidence that those persons from whom the loudest wails are heard are near the center of the pot.

Black students aggressively assert their African identity, but at every school I visited I found that courses on Africa were sustained not by blacks, but by whites. Blacks wear their African garb but they will not sign up for heavily academic classes on Africa.

The black studies movement was actually an Americanization process. That is the only real basis for its existence. The fact that black studies courses are needed within the university structure stems from the historic exclusion of Afro-Americans from the American mainstream. Therefore, the legitimacy of black studies does not derive from its "revolutionary" nature or from its potential usefulness in the erection of separate institutions; rather, black studies is rendered legitimate only to the extent that it facilitates our movement toward the center of the present American socioeconomic stage.

Paradoxically, then, although black studies is a political tool for black people and a product of centuries of American social history, its very survival on the American campus depends largely upon its ability to transcend the political struggle that brought it into being and to rise above the historical tradition to which it belongs.

Afro-American Pavilion at the Spokane World's Fair lures a long, patient waiting line of whites.

By Kathryn Johnston

Anyone for a whimmydiddle?

Dick Schnacke demonstrates a Jacob's ladder before an interested prospective buyer.

Or perhaps you'd prefer a flipperdinger or limberjack. They're all folk toys, handmade in a West Virginia business that's booming

We first met Dick and Jeanne Schnacke at the Harper's Ferry craft festival in 1973. Even in that 90-degree summer heat, one could sense an air of Christmas at the Schnacke booth as fascinated children and their parents milled about experimenting with "flipperdingers," "whimmydiddles" and "limberjacks." These are the products of the Schnacke's Mountain Craft Shop in Proctor, West Virginia, one of the largest sources of folk toys in the United States.

While Jeanne tended the booth, Dick manipulated toys, now and again encouraging a reluctant bystander to participate in the fun. He handed me one of the simple puzzle tricks, a miniature ox yoke, after demonstrating how it worked once. I took it masterfully in hand and immediately began to fumble. To cover this manual ineptness, I struck up a conversation and soon discovered that Dick had begun by carving simple wooden toys and selling them on the spot at a craft festival. For a decade he expanded his operation, eventually bringing in 46 individuals who collectively make about 150,000 toys annually. Then, in 1972, after 31 years as a mechanical engineer, he retired to devote full time to the profitable folk toy business.

The Schnacke home and Mountain Craft Shop nestle against a wooded mountain in the westernmost part of West Virginia. This is not native territory to either of the Schnackes, and, in the beginning, Dick relied on his own Kansas boyhood for ideas, reproducing the toys he used to play with. Soon, however, people approached him with ideas, and even samples. Now, at craft fairs, when he hears the inevitable "didja ever see one of these?" Dick knows he may soon be on the trail of another new (actually old) folk toy.

Among Dick's oldest and most important suppliers are the Postlethwait family, including sisters Bessie Nice and Olive Pruitt. Bessie, who lives with her 90-year-old parents, specializes in cloth snakes and dolls. She can make about 15 clothespin dolls on a good day. She is innovative and Dick readily admits to using her as a sounding board for new ideas and techniques. Dick fondly recalls the day Bessie arrived with a load of dolls and announced that Dick need no longer pay her. Fearing she was resigning, he asked why. She said that the nervous problem that had baffled doctors for years had suddenly disappeared, apparently a therapeutic result of toy making.

Down the road lives Bessie's brother, Pete Postlethwait, and his family. Until six years ago Pete's sole means of support was a small unprofitable farm on the side of a mountain. Now, with earnings from their toys, the Postlethwaits have paid for the farm, modernized the house and even accumulated some power tools and a workshop for Pete, whose specialties are the whimmydiddles and flipperdingers. He has a giant flipperdinger which bears the label: "This toy bought this farm."

Pete and his wife Alice were hard at work assem-

Oversized limberjack—a jointed doll—
seems to be making a normal one do its dance.

Photographs by Richard Beatty

bling some corncob dolls when we called on them. We couldn't help noticing the huge quantity being made, and posed the question of supplies. "We got all kinds of supplies of wood around us, plus the fact we grow our own corn," said Alice. "But I do remember one time when I went to the drugstore to collect an order of pipe cleaners for the dolls' arms. While I was paying for my 12 cases, a man behind me said, 'Why don't you switch to cigars?' "

Neither Pete nor Alice drives, and their mountain home is inaccessible to all but four-wheel drive. Dick Schnacke estimates that probably neither of them has been beyond a 50-mile radius of their home and, although a brand-new electric sewing machine sits in the living room beside the equally new television, Alice prefers the traditional treadle model upstairs.

In contrast to the Postlethwaits are Jack and Nancy Herrmann who, with their four children, live in Middlebourne, in a century-old house once owned by the state's first governor. Jack is a former welder with Schnacke's aluminum company and now works as an insurance salesman. Although the two men knew each other previously, it was Nancy who brought the family into the business of making wooden parts for folk toys. "I wanted something I could do at home, as well as something that would involve the whole family," she explains. In the family assembly line, Jack works with the larger saws, cutting planks and patterns, while Nancy does detail cutting on her band saw. Their children then assemble the parts to such toys as the ox yoke puzzle and the climbing bear.

Another man who uses folk toys as a lucrative excuse for working with wood is Jason Highley, a driver of logging machinery for a nearby sawmill. Jason and his young wife Clara Mae have five children and live in Wick, a community that has a population of 50. Shy and soft-spoken, Jason has been with Dick Schnacke for about a year. Although handicapped by the loss of his left arm, he makes beautiful doll furniture of clean design.

Dick still creates the prototype for each toy, and considers this the most rewarding part of his job. Quality control is a vital part of the operation. Each corncob doll must have a bean nose; each flipperdinger must flip; each limberjack must dance. Moreover, Dick must keep constant tabs on his own source of supplies, bearing in mind authenticity, cost and wearability. The inability to run down the right kind of straw for the woven seats of miniature chairs could cause that product to be taken off the line.

Sometimes Dick's need for exotic or extremely specialized supplies throws people off as to what his profession really is. He went on the television show "To Tell the Truth," and nobody guessed that he is a folk-toy maker. One of Dick's favorite stories, however, revolves around the flipperdinger. This toy looks something like an Indian pipe, but with a wire loop supported above the bowl. When you blow through it, a lightweight ball with a wire hook embedded in it rises magically and hangs itself neatly on the loop. Making the device requires a hollowed-out elderberry branch, a bit of wire, some corn pith (the inside of a cornstalk) for the ball and a small cork to plug one end of the pipe. It's that cork that has given Dick trouble. He must buy it at a scientific supply house in Charleston, West Virginia. After several trips, and several thousand corks, the clerk was curious enough to ask Dick why he needed so many very small corks. "Why," Dick replied coolly, "to plug the holes in elderberry branches, of course."

Grandson of craftsman Pete Postlethwait inspects a toy animal that his grandfather made.

These handsome dolls have faces fashioned of horse chestnuts (dark) and corncobs with bean noses.

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GOODYEAR

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Double Eagle

A canal in Georgetown, Guyana, is choked nearly beyond recognition with rapid-growing water weeds.

By Noel Vietmeyer

The endangered but useful manatee

Among the most threatened and least known marine mammals, the manatee could help solve one of tropics' major environmental woes

From New Zealand and trained as an organic chemist, Noel Vietmeyer is now a professional associate of the National Academy of Sciences in Washington.

Independently movable upper lips of a manatee permit it to munch effectively on aquatic vegetation.

On January 9, 1493, off the coast of Hispaniola (now the Dominican Republic and Haiti), Christopher Columbus saw three mermaids lift their heads above the water. Overjoyed at his good luck, the admiral recorded the event in his journal but was reported to have added wistfully, "They are not so beautiful as they are painted, though to some extent they have the form of a human face." Nine years later he saw mermaids again, at Azua on the south coast of the island, but by then it was known that the creatures were unusual aquatic mammals that spent their lives lolling in tropical waters feeding on vegetation. Columbus' brief statements are the first known recorded sightings of the manatee.

Spanish colonists who followed Columbus to the

Running parallel with canal opposite, this one is trim and free-flowing. The reason: one resident manatee.

Caribbean soon learned that veal-like manatee meat was delicious. An air-breathing, warm-blooded animal, related to the elephant, it bears live young and nurses them on milk. Even so, the manatee was classified as a fish by the Spanish church; its meat could therefore be relished on Fridays and other religious days of abstinence.

Manatee populations began to decline at that time, and now—with the exception of a very rare, tropical seal—manatees and the closely related dugongs may be the world's most endangered aquatic mammals. Found in more than 40 countries (mainly around the Caribbean, in the Amazon region and along most of the west coast of Africa), manatees nevertheless cling to survival by a thread. Although legally protected in most countries, their numbers dwindle because enforcement is impossible in the remote swamps, rivers and estuaries where they live. Many are unintentionally caught in fishnets where they tangle and drown, but hunting for profit takes a high toll. During a two-year period early in this century, more than 8,000 were slaughtered in Brazil.

In 1963 hundreds, and probably thousands, were slaughtered in Peru when uncommonly low levels in the Amazon headwaters made them vulnerable. Last year a Brazilian magazine published an article showing hunters capturing manatees and suffocating them by hammering wooden pegs into their nostrils (manatees cannot breathe by mouth). Today, in the United States, the 1,000 or so native manatees left in Florida are in great danger: They are shot at, maimed by powerboat propellers and increasingly deprived of territory by developers. Yet another danger is the pollution of Florida waterways.

Clearly, present legal statutes are not enough. New approaches must be found if the manatee is to survive. And there are some unusual reasons for preserving them: Manatees could help solve a major problem for millions of people living in the tropics.

In March 1973, the National Science Research Council of Guyana (a small republic located on the

Sunlight dapples the hide of a manatee, photographed in Florida where a small wild population remains.

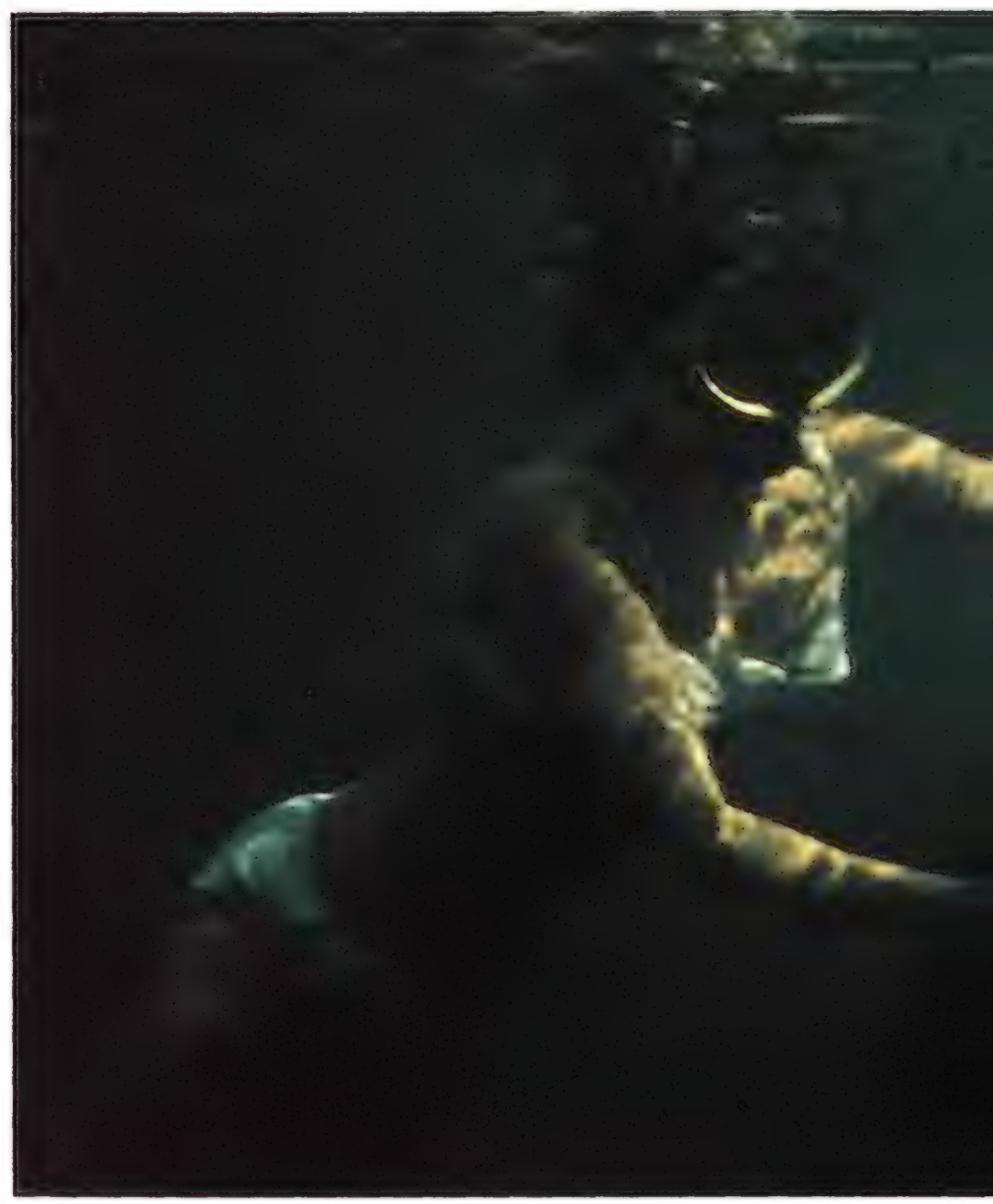
north coast of South America, formerly British Guiana) asked the National Academy of Sciences in Washington, D.C., to meet to devise solutions to the problems caused by aquatic weeds in Guyana. Readers in Florida and Louisiana will understand the Guyanese concern. Water hyacinths and other aquatic weeds cover hundreds of thousands of acres of waterways in those states. But they cover vastly greater areas in other places such as India, Bangladesh, the Sudan, Zaïre and Guyana.

Indeed, the explosive growth of aquatic weeds threatens to become one of the world's greatest environmental problems. In many irrigation projects the weeds infest the water and reduce flow to a trickle. Without the irrigation the projects were constructed to provide, crops cannot be grown and people starve. Each year impoverished farmers in Bangladesh face starvation from damage to their rice crop when rafts of weeds float over the rice growing in the paddies.

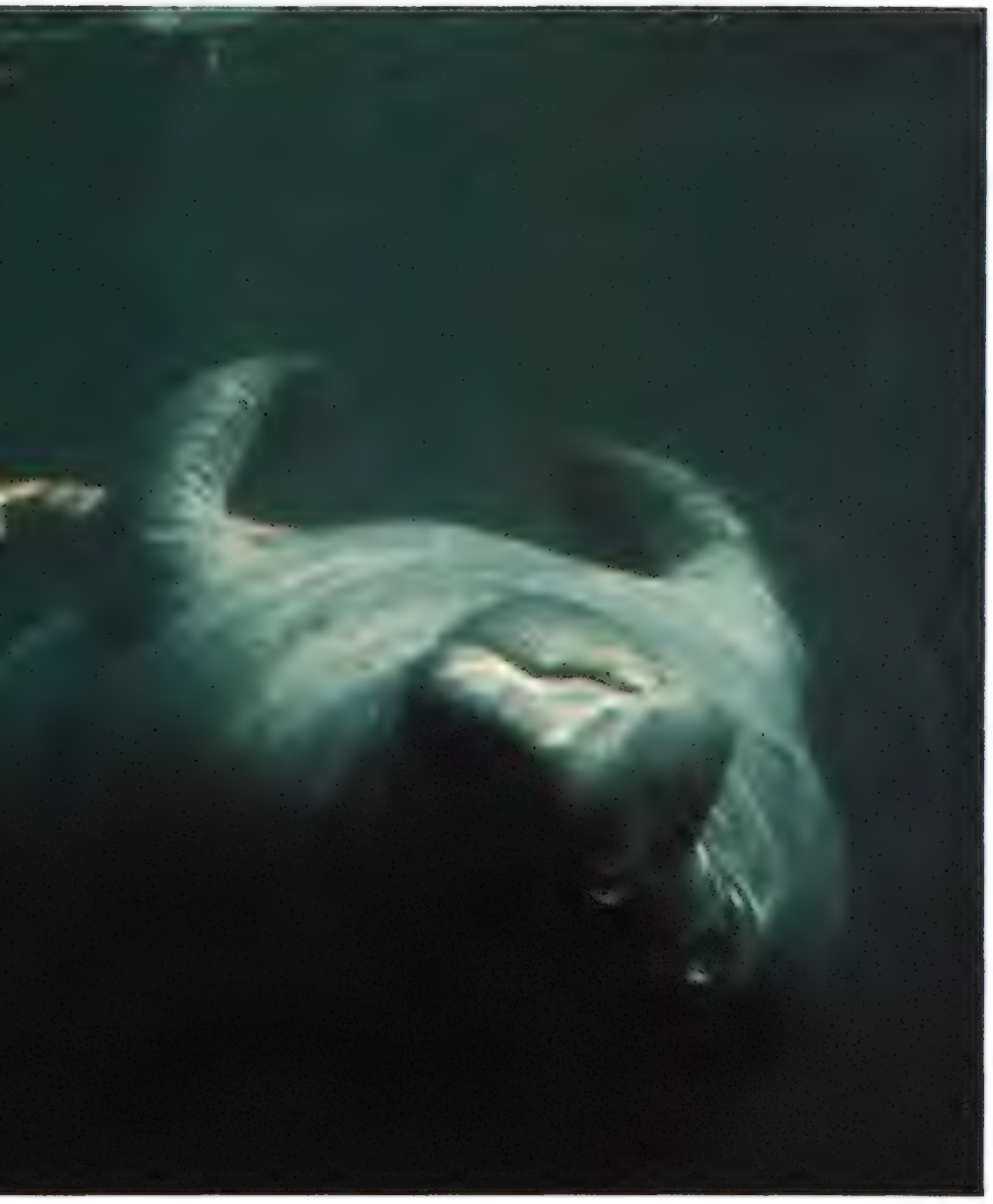
Aquatic weeds also harbor mosquitoes, vectors of malaria and encephalitis, and encourage the growth of waterborne diseases such as schistosomiasis, now classified as the world's most prevalent parasitic disease—reportedly, more than 200 million people are infected in the tropical regions of the world alone (see SMITHSONIAN, September 1971).

Acres of floating aquatic weeds weighing thousands of tons have clogged rivers, blocked shipping and burst bridges in many parts of the world. The Congo River is so clogged that large areas of the surrounding countryside in Zaïre have had to be abandoned for lack of transport.

The weeds can affect water quality itself, according to David Spurgeon of the International Development Research Centre in Ottawa: "An acre of growing water hyacinth imposes an oxygen-depleting load on the water equivalent to the sewage from 40 people."



In spite of its size (up to 1,200 pounds), the animal is gentle and harmless, as this diver demonstrates.



The 1973 meeting among the science organizations arrived at guidelines for turning Guyana's aquatic weeds into cattle feed and artificial peat moss, and for attacking them with fish, ducks, insects and herbicides. One recommendation called for reviving the uniquely Guyanese practice of using manatees to munch the weeds away.

Estimates vary, but manatees may eat as much as 150 pounds (wet weight) of aquatic plants each day. They have no front teeth, but their independently movable upper lips brush in the food where it is crushed between two smooth pads and ground by molars. Hardly fastidious, manatees will eat water hyacinths, bank grasses, submerged weeds and even lawn clippings.

Failure in Florida, success elsewhere

In the early 20th century, Guyana's sugarcane plantations used manatees to keep canals clear, but the practice lapsed. Then, from 1959 to 1962, more than 80 manatees were used to control weeds; again the practice lapsed during political turmoil of the mid-1960s. Nevertheless, a few still remain, some 15 years later, munching the canals clear. Two examples illustrate their effectiveness: The 2,000-foot-long canal at the waterworks in Georgetown, Guyana's capital city, routinely filled with weeds in less than two months, until two manatees started keeping the weeds down to the level of an innocuous underwater lawn just a few inches tall.

The other example is the overflow canal from a small lake in western Guyana. In 1959 two manatees were introduced to this weed-prone canal which had always required manual cleaning. In 1974 the manatees—plus an offspring—are still there. In the 15-year interval nothing has had to be spent for clearing weeds. In fact, the canal is so clean and worries the engineers so little that they seldom even send a ranger to check on it or the animals.

In the mid-1960s a trial project using eight manatees to clear waterweeds in Florida failed when most died of pneumonia induced by cold weather. (Native manatees survive Florida's winter by retreating to a few warm springs.) Two of the manatees were maliciously killed. While they lived, their weed-clearing feats were spectacular, but the trial suggests that their usefulness will be limited to the true tropics.

Today, in spite of growing interest in the biology and conservation of marine mammals and in spite of the manatee's utility to man, there is almost no long-term, on-the-spot research on manatees under way. More needs to be known about the fundamental biology of manatees. Little is known of their respiratory and reproductive processes, their circulation, endo-

crinology, digestive or nervous systems. We do not even know how long they can live in an optimum environment. Buccaneer William Dampier's description published in 1729 is essentially as good a three-page scientific description as one could write today. But what *is* known about manatees is tantalizing. For example, their blood clots very slowly. Could study of this phenomenon be important in understanding the human diseases of thrombosis and hemophilia? Manatees live and feed freely in both fresh and salt water. What mechanism of salt excretion allows this? Manatees make whalelike and dolphinlike sounds, although their repertoire is by no means as complex as that of the cetaceans. What is the significance of their squeals and chirps? Formed continuously at the back of the jaw, the manatee's molar teeth steadily move forward until they fall out at mid-jaw. What is the purpose of this and how does it work?

Often called sea cows (they are related to the now extinct Arctic sea cow), manatees do resemble cattle in their diet, docility and ease of domestication. Though they grow up to 12 feet long, and weigh as much as 1,200 pounds, manatees are shy, retiring, humble creatures. They do not fight for territory or food. Content to be left alone to munch plants, their worst if not their only serious enemy is man. They sleep on the bottom of the waterway, automatically rising every few minutes for air. A manatee calf is born underwater but, lest it drown, it is believed that the female quickly maneuvers it onto her back for its introduction to breathing patterns. The female's mammary glands are located on the flipper close to where it joins the body; she suckles her calf for up to two years, and the pair appear to have a strong bond of affection, communicating with one another in chirps.

Primarily solitary animals, except for the cow-calf relationship, manatees may nuzzle one another, embrace with their flippers and even "kiss" when they come into contact with one another. The only aggressive behavior they show is when bulls collide in the course of pursuing a cow in estrus, at which time they thrash about violently but apparently inflict no injuries. In response to a threat, the manatee's only line of defense appears to be flight—adults have been clocked at about 15 miles per hour when in flight; normally they cruise at about four miles per hour.

In a recent study of Florida manatees, one observer noted a considerable amount of playful nuzzling among juveniles and between juveniles and adults, much of it appearing to have sexual overtones. Juveniles also will twist and barrel-roll through the water, as if to amuse themselves.

In February 1974 a second meeting of science councils from the Guyana region, international organizations, and researchers from eight countries was held in Guyana to consider further the manatee's plight. Participants recommended the establishment in Guyana of a small international research institute to study manatee breeding, husbandry and management—an institute that would be a closely interacting unit of biologists working on basic research, veterinarians and nutritionists developing husbandry techniques (after the style of cattle husbandry), applied scientists working on the animal's weed-clearing potential, and conservationists working to prevent the animal's extinction. Manatees are such a promising research subject that such an institute could attract leading researchers in each of these fields, thus concentrating some of the world's finest talents on manatee survival.

The first steps are under way to establish the institute. A committee of scientists has been organized to direct the first phases. The government of Guyana has generously offered to provide land and legal statutes that will allow the research facility to be an autonomous, international institution operating in Guyana. Funds and support are now being sought for launching this unique project.

The underlying barrier to the manatee's survival—its slow reproduction rate—is also an obstacle to its use to man. Manatee husbandry will take time to accomplish. Because the approximately year-long gestation period cannot be circumvented, herd production will be slow (it may take ten years to develop the first manatee farm), but the first steps must be taken—and soon. If its reproduction can be maintained, manatee survival can be assured, and Man will have a useful new friend for the future.

Warm water, lots of weeds make a content manatee.
On first sight, Columbus mistook them for mermaids.

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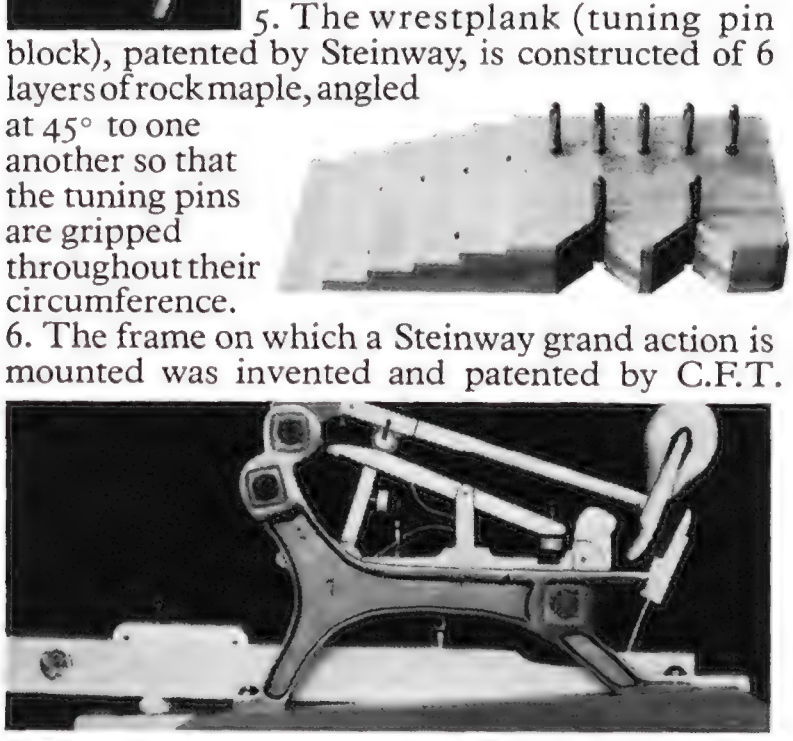

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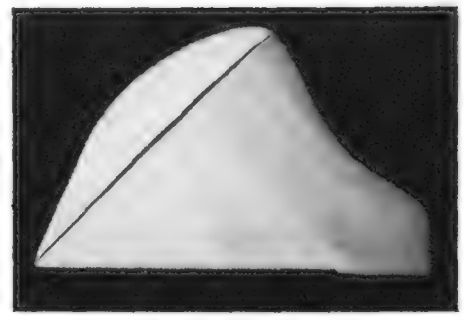

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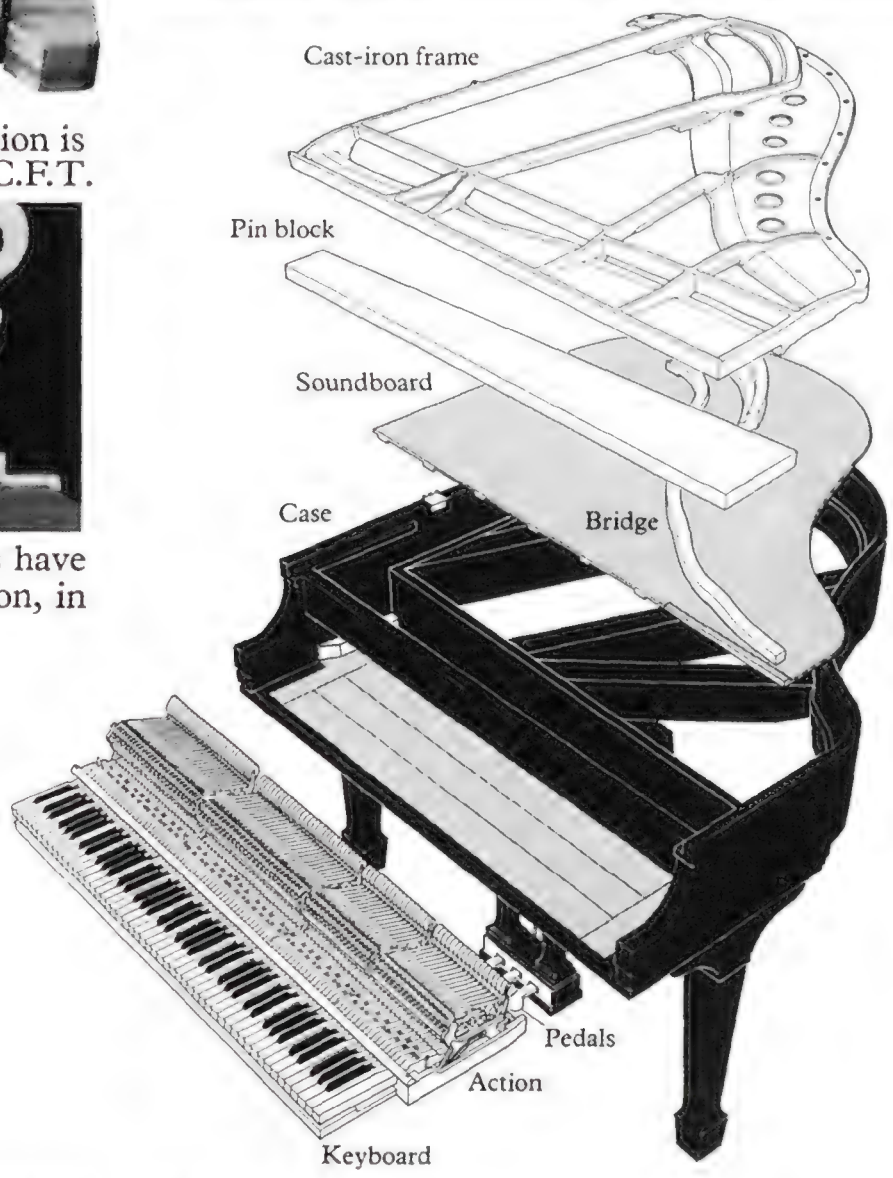


STEINWAY & SONS

By Sherwood B. Idso

Summer winds drive dust storms across the desert

In Arizona, afternoon thunderheads produce dome-shaped haboobs that, like giant amoebas, swallow everything in their paths

A sunlit shaft of rain and hail begins to drop from a thunderhead just before a dust storm forms.

The Sunday began as a typical summer day for most Arizonans. Skies were clear and the weather warm and sunny. Thunderstorms with associated blowing dust were forecast as a late afternoon possibility for the southeastern valleys; but during the summer this forecast is almost a daily ritual.

By 5 P.M. thunderstorms had already buffeted the Tucson area and raised considerable dust in advance of the rain. Several of these thunderstorm cells converged and began to move up the Santa Cruz Valley toward Phoenix. At 6:45 P.M. the weather bureau in Phoenix issued an advisory:

A LINE OF THUNDERSTORMS HAS BEEN MOVING NORTHWESTWARD FROM THE TUCSON AREA TOWARD PHOENIX. A DUST STORM WAS REPORTED BY PILOTS AROUND 30 TO 40 MILES SOUTHEAST OF PHOENIX AT 6:30 PM.

THIS LINE OF THUNDERSTORMS CAUSED WIND GUSTS UP TO 44 MPH AND CONSIDERABLE BLOWING DUST AS IT MOVED THRU TUCSON AT 5 PM SIMILAR WINDS AND DUST ARE LIKELY AROUND THE PHOENIX AREA AT ABOUT 8 OR 9 PM THIS EVENING.

At that time, weather bureau officials did not know that the dust storm had already caused five deaths on Interstate 10 between Tucson and Phoenix. At about 6:20 P.M., W. A. Holliday of Tucson was driving north through the storm when he encountered two cars stopped in the right lane. He moved into the passing lane and stopped just inches away from another car "in a heavy dust cloud that was impenetrable." He was about to pull onto the median when his car was struck from the rear by a pick-up truck which then apparently vaulted over his into the car in front. "From then on it was just bang, bang, bang—like the Fourth of July," he said, as more than 20 cars, trucks, campers and motorcycles piled into the growing conflagration. Thirty-foot flames erupted from burning vehicles, turning cars into incinerators. Five people died outright and 27 more were injured, three of whom later died in hospitals.

A freak accident? Not for Arizona and many other desert areas of Southwestern United States. Almost every year sand and dust storms reap a deadly harvest of lives and property damage. In fact, less than a year after this accident, an even more devastating one occurred about eight miles farther north. Cars stopped in the middle of the road just as the year before, and were hit from behind by other cars. This time, however, two separate pile ups occurred in both directions —14 vehicles on one side of the freeway and 16 on the other. Although they were separated by about half a mile, people involved in each accident were not aware of the other because of the dust. As one survivor put it,

Sherwood B. Idso is a research physicist at the USDA water conservation laboratory in Phoenix, Arizona.

A dust storm moves across the desert near Ehrenberg, Arizona, taking on the color of the soil. Water clouds form continuously as warm air is scooped up. Still higher clouds of ice crystals are decaying.

Signs on Arizona highway warn drivers of haboobs; when a storm hits, visibility can drop to zero.

"It was just like a curtain dropped over the road. One minute you could see; the next second you couldn't."

To find dust storms that in any way approach the intensity and magnitude of an "Arizona duster" one must span a goodly section of the globe. Only in the legendary haboob of the desert areas of Egypt and the Sudan will one find its equivalent. Derived from the past tense of the Arabic verb *hebbe,* meaning "blow," this term is used in many parts of Arabia to mean a dust-raising wind; and it is now finding its way into American usage.

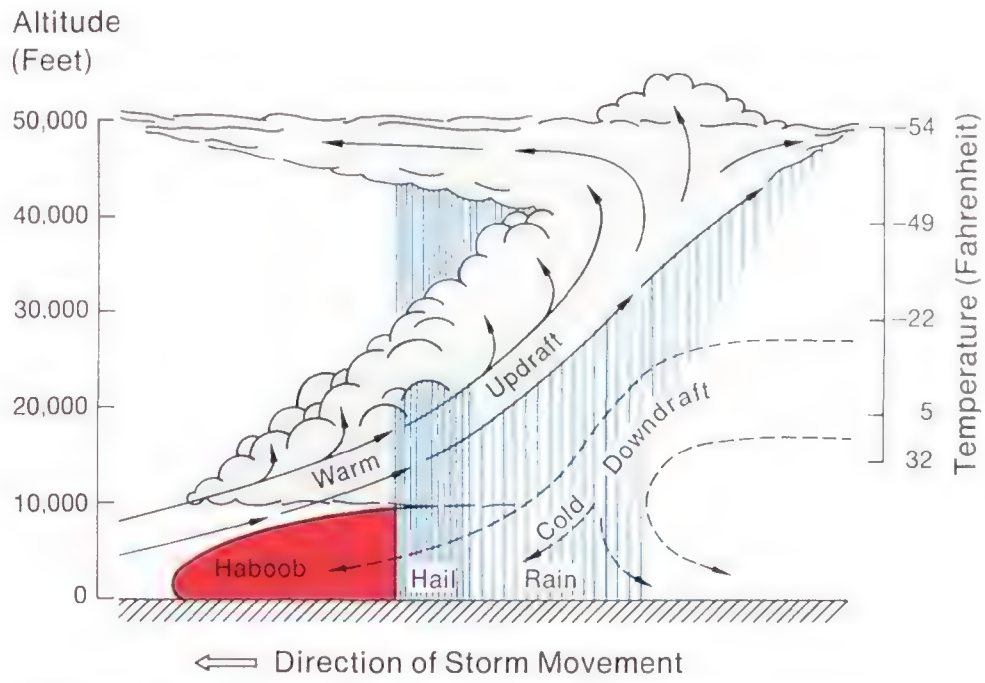
The key to haboob formation in both the United States and the Sudan is intense convective activity leading to thundershowers. Rain falling from huge cumulonimbus clouds cools the air through which it passes, generating strong downward air currents. This rain-cooled air spreads out over the ground beneath and ahead of the parent cloud, churning up the loose surface dust and sand of the dry desert floor. The Pima Indians of Arizona have a legend that "the rain is blind and always has to be led by the sandstorm."

Haboobs form when rain first begins to fall. This initial precipitation generally evaporates before it reaches the ground. Air cooled by the evaporating rain moves rapidly downward to the ground, where it first raises dust that, according to an account by M. H. Freeman, "resembles smoke from a line of fires on a windy day, with dense columns swirling upwards. . . . As the haboob develops these columns merge to form a billowing wall of dust" that soon rises to the level of the cloud base.

The leading edge of the cold air is usually very distinct, taking on the color of the desert soil it carries skyward. As it pushes ahead, this undercutting wedge of dense air lifts the lighter, warmer air of the sun-baked desert and feeds it back into the convective updrafts of the following cumulus cloud system to continually regenerate itself. The result is a sometimes long-lived storm of considerable intensity. In the Sudan, where much research has been conducted, haboobs have lasted six-and-a-half hours, with an average duration of about three hours. Peak intensity lasts 30 minutes to one hour.

Although the leading edge of a haboob takes on the appearance of a "solid wall," there is a distinctive, ever-changing structure associated with it. According to T. J. Lawson, who observed dust storms in Khartoum, as the front moves along, "a push of cold air from within the body of the haboob will cause the formation of a bulge, or lobe, which appears to grow forward at a slightly faster rate than the average speed of the front. The lobe will expand vertically and horizontally until, when its forward movement relative to the front has decreased, irregularities will start to appear in its leading edge, causing any fresh surge of air moving up from behind to flow to one side. In this way, new lobes [are] continually appearing out of the dying stages of a previous one."

In addition to this "microstructure" there is also a "macrostructure" associated with each haboob. Several photographs from widely separated points in Phoenix revealed that the great Arizona haboob of July 16, 1971, had at least three huge undulations in its frontal boundary, each about ten miles across. These macro-



Inside a thunderhead, air cooled by rain moves rapidly downward, churning up the loose dust and sand from the dry desert floor to form a haboob. Rising warm air provides supply of new moisture.

A dust storm strikes downtown Phoenix near sunset. Most haboobs form in late afternoon or early evening, sharply reducing whatever visibility is left and usually forcing traffic to a standstill.

lobes may have been associated with three separate thunderstorm cells; but they could also have been the result of the terrain. Smaller haboobs usually spread out in one large circular arc.

Haboobs move across the desert at an average 32 miles per hour, with the greatest speed being about 45 miles per hour. Gusts within the main bodies of the storms, however, are generally twice as great as the mean speeds of advance of the fronts. Thus, with gusts of 60 to 90 miles per hour, huge volumes of sand may be moved, and trees and buildings severely damaged.

When a haboob passes any given point, the air pressure may fluctuate greatly, due to the increased density of the rain-cooled air displacing the lighter, warmer air before it. Temperature drops as great as 23 degrees F. have been recorded.

At Phoenix about 12 haboobs per year occur during the rainy season of the summer monsoon, while at Khartoum in the Sudan about twice as many are experienced every year. Arizona storms have raised a surface dust cloud as high as 10,000 feet and 100 miles in breadth. It is possible that some extend to 15,000 or 20,000 feet, as aviators reported finding the dust from large storms over Colorado at those heights during the Dust Bowl of the Thirties in the United States.

Having been born and raised in Minnesota, it was not until moving to Arizona seven years ago that I experienced my first haboob. My family and I were living in a first-floor apartment in Tempe, and we did not have a good view of the horizon. After never having seen a cloud of any kind since our arrival, we were shocked one day in July to see the sun suddenly disappear from view, shrouded in a veil of dust which seemed to come upon the city from out of nowhere.

The sky remained darkened for an hour or so and then gradually cleared. Our cursory inspection in the storm's aftermath revealed that the apartment swimming pool had acted like a magnet for the dust, as had our car, which naturally had been left with its windows open. About a year later, we moved into a house on the outskirts of the city. One day while we were strolling around the block, we saw what looked like smoke on the horizon. We climbed up on our roof to get a better perspective. What we saw seemed unreal. Stretching out before us as far as the eye could see was a gigantic dome-shaped layer of swirling dust and sand that seemed to languish upon the desert. Watching for a while, we saw that it was moving toward us.

Like some giant amoeba from a science-fiction story it slowly advanced, blotting out everything in its path. In moments, it was upon us.

After this experience, I began to take every opportunity to observe and photograph local dust storms and study their characteristics. In a cooperative study with the National Weather Service, we found that most of the Arizona haboobs are caused by downdrafts from thunderstorms which develop over the mountain complex straddling the Cochise and Pima County boundary and the Mogollon Rim. The air mass thunderstorm activity is apparently generated by the convergence of moist, semitropical air raised by up-canyon winds on east-facing slopes in the late morning and up-canyon winds on highly heated west-facing slopes during the afternoon.

Haboobs that develop southeast of Tucson usually move unimpeded up the Santa Cruz Valley as an organized squall line. This type generally arrives at Phoenix between 5 P.M. and 9 P.M. while the rest arrive mostly between 3 P.M. and 5 P.M. Two out of three of the storms are followed by thunder and rain up to two hours later.

The onset of the haboob season in Arizona generally coincides with the total immersion of the state in tropical maritime air characteristic of the summer monsoon. According to Robert S. Ingram of the National Weather Service in Phoenix, "During the latter half of June, upper-level moisture begins to move westward into Arizona from the Gulf of Mexico." The influx is not a steady progression but is rather like the ocean tides that continually surge and retreat, each one surging higher and deeper. He notes that "the moisture aloft floods and ebbs into Arizona as the subtropical high-pressure ridge aloft builds irregularly and steadily northward with the seasonal northward shift of the jet stream. . . . These surges do not represent the true summer monsoon, but are what may be called the false monsoon."

The average date of the first false monsoon at Phoenix is June 21, although it has occurred as early as June 11 and as late as July 3. The true summer monsoon does not generally arrive until about July 8, when the Gulf of Mexico air no longer retreats. In addition, this high-level moisture also appears to be augmented at the lower levels by surges of moist tropical air northward up the Gulf of Baja California. This flow has been documented by both surface observations and satellite photographs and has generated some of the more severe haboobs to batter south-central Arizona.

Arizona officials can't stop the monsoons, but they are trying to reduce the toll of the resultant haboobs. Early efforts at educating the public to the dangers inherent in highway travel during dust storms consisted chiefly of static warning signs, plus a few signs with manually changeable sign panels to be used at times of actual dust-storm occurrences. The average motorist would not heed such warnings, however, until he suddenly couldn't see and was already in serious trouble. In addition, the credibility of the changeable signs was reduced due to the inability of highway patrolmen to always cover them again following restoration of normal conditions.

To cope with these problems, a system of some 40 signs utilizing remotely controlled changeable messages was developed and installed along interstate highways in the area. These signs are spaced at approximately five-mile intervals, with one in advance of each off-ramp, so that a motorist warned of an approaching dust storm has the opportunity to leave the freeway and seek shelter on a side road.

The state hopes to install an automatic dust detector at each sign, possibly utilizing laser beams or infrared light. At the present time, however, and in addition to any system that may be installed in the future, service stations within the most hazardous areas will serve as dust-warning stations. They have a station number and call the Department of Public Safety whenever a haboob is spotted. In addition, warnings are broadcast over local radio stations and on a special public service frequency. These efforts, combined with educational campaigns by local newspapers and television stations, are designed to reduce the toll of dead and injured left in the wake of these wild winds of the desert. Like tornadoes, haboobs cannot now be prevented, but people can learn to live with them.

Two of the author's sons, Grant and Keith, experience the fury of a haboob on the desert south of Phoenix.

Kneeling on a sand painting, Mary Gray Mountain holds her 13-day-old son, who was thought to be dying, in this photograph taken 20 years ago. Long Salt, the medicine man, chants ritual.

Now grown, 20-year-old Robert Lee and his bride wash one another's hands in marriage ceremony.

By Robert Northshield

The healing of Robert Lee

The Navajo baby that almost died survived, and when a film crew documented his life, they found that ritual can supplement science

Robert Northshield is an executive producer at NBC News. The film he made of Robert Lee Gray Mountain is scheduled for December 23, 10 P.M. EST.

The first time I saw Robert Lee Gray Mountain, I was a producer of television documentaries, working at my job, and he was a 13-day-old Navajo baby, dying. Lee Boltin took a picture of him (opposite), and his mother named him for us—Robert and Lee.

The next time I saw him, I was at the same work, filming a wedding in Arizona. And he was the 20-year-old bridegroom, handsome and healthy. I thought back to the tiny, wasted infant that I had seen 20 years before in a log-and-earth Navajo hogan. Everyone knew at that time that Robert Lee Gray Mountain could not survive—everyone except his mother, Mary, and the medicine man, Long Salt, to whom she had turned for a miracle. I learned a few weeks later that Long Salt had produced one: Robert Lee was alive. And then I stayed so busy that I lost track of him.

When, years later, I tried to trace him, it was easier than I thought. With the help of old friends I learned enough to propel me straight north out of Arizona along a nearly impossible dirt track to Navajo Mountain in Utah, highest point on the Navajo Reservation. The Navajos name every landmark and explain, in terms of mythology, every wrinkle and rise. And of all their sacred places, Navajo Mountain is one of the

Mary is the subject of this "sing" as medicine man Green Stone touches her with corn pollen.

most sacred—the head of a giant goddess that stretches for 100 miles to the southwest.

I made a survey trip up there, and Mary remembered me and the time her firstborn didn't die. I had planned to film a documentary on "Whatever happened to Robert Lee Gray Mountain?" in the spring, but suddenly I had to rush. He wanted to get married, and of course I wanted to film that. So we were set up with cameras when the Gray Mountains—Robert Lee, his father Homer and his mother Mary—drove up in their truck. I walked over and introduced myself to the young man. He smiled and shook my hand, then disappeared into the hogan to get married.

We started work and every frame of film seemed to show us why Robert Lee was alive, what influences surround Navajo life and make ritual so important. Finally, we saw the healing treatment repeated.

One day we were scheduled to film the Gray Mountain family herding and shearing sheep, but we canceled the plan when Mary fainted. Everyone knew she was very sick. No one knew why.

One of her brothers, Harold, cleaned up the oldest family hogan and another, Buck, climbed the sacred mountain to gather special plants. Robert Lee went to Kayenta to get his bride; Homer and Mary drove 50 miles to find another medicine man, Green Stone, for Long Salt was sick and couldn't work. Within a few hours, the entire family was together again. Mary, naked to the waist, knelt on the sand floor of the hogan, singing, chanting, believing.

Half a year's income was spent in two days of feeding and curing. Then, after the ancient "sing," Mary was helped into the cab of a pickup truck and driven to a modern hospital. She made that trip only when she was ready for it. Within the white man's culture she received specific medical treatment for her infected kidneys and allergies, which proved totally successful. Maybe it would not have been, had she not been strengthened within her culture to choose the white man's cures.

A week later, Long Salt, well again, was back at work. For several years he had been teaching Mary's brother, Buck, to be a singer. Buck is nearly 50 and still an apprentice. One long night, in another hogan lighted by our photographic equipment, we listened and learned as the old man whispered and murmured and sang of worlds before there was time, of places and devils that could not exist outside a great man's imagination. And after that, Long Salt asked me to take a sweat bath with him, a rare and flattering invitation.

Inside our tiny hut in the darkness and indescribable heat from glowing rocks were three bent men—Long Salt, his son-in-law Ashley—and I. Ashley spoke flawless English and translated Long Salt's speeches and songs.

The old man's stroke had left him with little crippling. But in the black, searing air of the sweat-house, I learned of his doubts and confusions. Like Mary, he needed to be put in touch with "the way," to be told that his strength was permanent and grand enough to let him take from both the cultures. Inside that gorgeous little hell, he was told—and he sang. In just two days Buck, his appointed successor, assembled the paraphernalia for another ritual cure. It was spectacular and wonderful: the twisted old man, his powerful body smeared with soot to hide him from the ghosts, rocking and singing to the rattle cadence; the young singer, Buck, weaving around the hogan, shouting the demons away, caring for his teacher and his people. Wife, in-laws, daughters, grandchildren and visitors were watching and smiling.

Just at sunrise, Buck flung open the door to capture the dawn. Like every hogan, that one had its doorway open to the east, and the sunlight shot in on a scene of peace and understanding—Long Salt was asleep, curled up like a baby.

Long Salt, making a crown of yucca and eagle feathers, is treated by his apprentice, Buck.

By David R. Zimmerman

They fight eagle's curse of Cain

Among certain species, two eaglets hatch in each nest but one inevitably dies. Two young Europeans have solved problem

German doctor Bernd-Ulrich Meyburg returns stare of imperial eagle recuperating in his backyard.

At my feet in the car was a straw market basket, the kind in which peasant women carry eggs and chickens to market. In fact, chicklike *cheeps* arose from it, punctuated by an occasional *meow*, but its animate contents were neither chicks nor kittens.

The bird in the basket was an eaglet. It was going home, to a huge, leaf-lined, stick-and-branch aerie, 60 feet up the trunk of a tall, straight forest tree. The forest is in the Carpathian Mountains of eastern Czechoslovakia, through whose pastoral foothills we now were racing, at speeds of up to 100 miles an hour.

Under normal circumstances, the eaglet would be dead. The cause: *The Curse of Cain*. In the Bible, Cain, the elder, slew his younger brother Abel. So would it have been with this Abel eaglet, the second hatched of its mother's two eggs. Cain's curse is believed to confer a survival advantage upon these eagles. Each mature pair usually produces two eggs. They will rear but one eaglet, however, which thus gets all available food and their undivided attention.

That the Abel eaglet at my feet had survived, and had thrived, it owed wholly to the young man driving the car. He had thought up a procedure, now in progress, to exorcise the curse of Cain, thereby permitting both young to live, and ultimately fledge.

A young lesser spotted eagle, about to be returned to nest by Ján Švehlik, threatens hand that fed it.

Most eagles in Europe are locally threatened, or endangered. So a method to double a pair's annual reproductive yield could be a conservation tool of great value. The method, in essence, is ridiculously simple. The Abel eaglet is taken from the aerie either just before hatching or soon after. Alternatively, Cain, which may have hatched as much as a week earlier, may be taken, leaving Abel. The important thing is that there be but one eaglet in the aerie.

The removed eaglet, say Abel, then is put in the nest of another raptorial bird, perhaps a black kite. (The kite chicks are redistributed among nests of others of their species.) Kites have proved to be tolerant, willing foster parents to the eaglets. Without pause or complaint, they begin to bring food to an eagle chick that may be quite different in size and appearance from their own, now missing, young. On the other hand, the cross-fostering can be done by humans.

Cainistic impulses slowly abate and are almost gone after two months. Then it is safe to leave Abel with Cain in their natal nest so that both can develop important eagle abilities—to fly, to forage, to feed.

Once the cross-fostering technique was tested and proved, in 1968, refinements were added. To keep Abel from becoming too accustomed to, and trusting of

Lesser spotted eagle, Cain, has just hatched. Abel, in egg, will be forced from nest after hatching.

Man, he (or she) can be returned to the aerie, while Cain is temporarily cross-fostered elsewhere. This exchange can be repeated several times—and just such a mission now was in progress. The Abel, cheeping softly in its basket as the car ripped over the roads, was to be exchanged for its much larger sib, Cain, which already had had one period of cross-fostering by humans, just after Abel's birth.

The exchange was being made by the technique's inventor, a young West Berliner, Dr. Bernd-Ulrich Meyburg. With him was his colleague, co-worker and host in Czechoslovakia, Dr. Ján Švehlik. Meyburg is 26, Švehlik 24. Both are doctors, and both completed medical school this year, Švehlik, as it happens, having received his medical degree on the previous day.

He grew up and lives in the Slovak city of Kosice, at the far eastern end of Czechoslovakia, near the Russian border. The day's expedition had started at his home there, where eaglet Abel had passed the previous week in a bough-lined box on the back porch.

Meyburg, the German, is an extraordinarily intense, productive young man. He has been torn between a career as a raptor biologist and conservationist—work that he loves—and medicine. He seems to have made a reluctant choice to join the practice of his parents, who are both plastic surgeons. He hopes this specialty, unlike, say, pediatrics or obstetrics, will permit him the time to pursue his raptorological endeavors—in which his attainments are already impressive.

Meyburg has published more than a dozen research reports on raptors. For each, he spends hundreds of hours in blinds; so as not to alarm his subjects by his comings and goings, Meyburg's typical day in a blind is 15 hours—from before sunrise to after sundown.

When he slides behind the wheel of his car, he is equally intent. He is a calculating driver, for whom one basic equation is that *you*, the other guy, must yield. The car pushed easily to 100 mph on the two-lane Czechoslovak country roads. Meyburg slowed down only briefly, and at the last possible instant, to tear through a Slovak town, scattering Sunday strollers to the road shoulders.

The eaglet on the car floor did not seem to mind the speed; neither did Slovak Švehlik, who drives almost as fast when it is his turn at the wheel. Perhaps speed is a behavorial trait of eagle conservationists.

Meyburg says that the idea that Cain's curse could be broken first came to him when he was 13 or 14 years old and just getting deeply into eagles. One of the half-dozen species that breed in Germany is the dark brown lesser spotted eagle (*Aquila pomarina*). The name lesser spotted eagle is inelegant and clumsy, and Meyburg and Švehlik avoid it, calling the birds by their biological name, "pomarinas."

The pomarina is not the only raptor that lays two or more eggs but rarely fledges more than one young, but it seemed to Meyburg to be the extreme case, for there were no reliable records of two young pomarinas having flown together from the same nest. When he conceived the notion of trying to save eaglet Abel, he says, he was surprised to find that he was the first to have thought to do so. "What astonished me," he says, "was that it was an idea that was so *ready*—and nobody had tried it in a serious way."

His first attempts to study the eagle, in Germany, met rebuff. In both West and East Germany, he says, eagles have been proclaimed "national monuments" for their protection. Stiff fines are levied for killing an eagle, or bothering it in any way. This protects the

Meyburg feeds three Cains temporarily boarding on the porch. They tolerate each other while feeding,

but soon afterwards a fight breaks out. In nature, Abels, thus intimidated, starve or fall from nest.

birds from meddlers, but also renders them inaccessible to legitimate scientists and conservationists.

To add to Meyburg's difficulties, West Germany, of which he is a citizen, had only a few pomarinas left; East Germany had a workable number. In 1965, when he was 17 years old, Meyburg applied to the appropriate official there for a special license for his research and conservation experiments. He was accorded polite interest, but no permit, so he turned to Czechoslovakia, where the protective laws were less restrictive—and which offered one enormous bonus: Biologists had achieved the remarkable feat of marking and mapping some 600 trees used by raptors by searching for their huge stick nests in winter. In the spring, they returned to watch and study the birds. They sometimes could help them by having roadwork or some other disturbance near a nest halted. Ján Švehlik, a strong woodsman, had contributed to this effort, and it was through Meyburg's request for eagle aerie locations that the two men met.

In the first two years, Meyburg spent some 270 hours in blinds, staring down at the family lives of the eagles, photographing them, and filling notebooks with behavioral data. For a closer look, or to weigh or move an eaglet, the aerie tree had to be climbed.

His observations soon convinced him that the first, established chick's Cainistic aggression toward the upstart Abel could be every bit as ferocious as it had been described to be. "From the age of one week," Meyburg says, "a chick placed on a table [invariably] would crawl toward a smaller eaglet [placed] within a radius of half a yard, and attack—in one trial, ten times in rapid succession."

Strangely, however, Meyburg never saw Cain actually slay Abel. More puzzling, he sometimes arrived to find Abel on the ground beneath the aerie, dead, but unmarked by any sign of battle. Moreover, while there was no denying the ferocity of Cain's attack, most Abels died while their Cains were still too small to kill them directly by pecking or clawing.

He observed that while the older, stronger chick invariably initiated the stereotyped *aggressive* behavior toward the weaker, new one, the Abel responded with similarly stereotyped *intimidated* behavior. It was not direct beak and claw aggression that did Abel in, but his (or her) reaction to the threat it represented.

"It's not a matter of physical strength," Meyburg says, "It's a psychological thing, an acceptance of intimidation. It's fascinating to watch how, after a few peckings, even if it has not been hurt, the smaller chick lies down so that the parent can't find it with food." Then it retreats still further. "It runs away, from the center of the nest to the edge, where it cannot be brooded, and where the mother cannot feed it, since she brings food to the center of the nest, where Cain gets it. Abel either dies of starvation, or of exposure, or falls from the nest."

At first, Meyburg hoped that removing either the Cain *or* the Abel eaglet for only a short time would

Mr. Zimmerman, a New Yorker, specializes in medical and ornithological subjects and is writing a book on endangered birds with help of World Wildlife Fund.

permit the destructive behavior to pass. But repeated attempts to reunite sibs failed; the antagonism continued. Only just before flying could they safely be left together. Meyburg wrote about a firstborn chick and a second-born one which he finally united in a nest at about eight weeks of age: "Neither shows any aggression any more. Sometimes they lie peacefully side by side in the nest bowl. Abel flew on August 11, about 20 hours before its nest companion." This was supreme success: Two pomarinas had flown from a single nest.

Meyburg and Švehlik later watched the cross-fostered eaglets flying and hunting with their parents. Meyburg believes they succeed, like normally reared eaglets, in this transition to independence, which he sees as one of the most important periods, behaviorally, in an eagle's life. He thinks, although he has no proof, that the eagles have not been tamed and so will not approach humans. He feels, too, that they have not been imprinted away from eagles to kites or humans, which might compromise later reproductive behavior.

This will be difficult to prove, and Meyburg has no plans to try. It could be done by marking cross-fostered birds with bands and colored jesses, and searching for them in later years during breeding season. Difficult as such a study might be, it will have to be done before Meyburg can claim full success.

In the first year, 1968, Meyburg saved three pomarinas that otherwise would certainly have died. Later, his record of "saves" reached about 20. This may not be an enormous number, but it *is* a taste of what might be achieved if the technique were applied systematically to a threatened group of birds. In Germany, where pomarinas have declined rapidly to an estimated 60 pairs, there may be no time to lose.

The day I joined Švehlik and Meyburg, a Sunday in late June, was to be Švehlik's last day in the field for the year. The following morning he would start five weeks of military service. Meyburg, who was staying in his apartment, would cross-foster and return the pomarinas. In addition to their new professional obligations, both young men had imminent plans for marriage, and there was some joking between them as to whether the eagle work would suffer as a result. Meyburg swore it would not.

The car ripped through the countryside, scattering Sunday strollers and provoking clenched-fist, bent-arm gestures that were *not* salutes to Lenin. Finally, as the light fell, the car stopped by a meadow at the edge of a handsome wooded mountain. Meyburg, who had been suffering a fierce toothache, elected to stay at the car, and I went in his stead with Švehlik to put Abel back in his aerie. Švehlik would bring back the much larger Cain—who already had spent a week on his kitchen porch while Abel enjoyed an initial period of undisturbed eagle mothering.

The forest was cool, damp and green—peaceful and empty of humans. As we approached the nest tree, the female eagle *creeked* a complaint, rose from the nest, and for the brief duration of our visit, wheeled in anxious circles just over the treetops.

First, Švehlik put on his spikes and climbing belt. Then he tied a coil of thin red rope to his belt and started up the tree. *Chunk. Chunk. Chunk.* His spikes dug in, and he vanished into the foliage-shrouded branches at the top of the tree. Then the tip of the red rope snaked downward to the ground; at its end Švehlik had tied a small zippered pouch, whose sides fairly bulged with the Cain eaglet. I opened the zipper and followed Švehlik's shouted command to slide the bird's head out first, and then its wings—*carefully*—so that it would not injure itself.

In an instant, Cain caught sight of Abel, reared back, beak agape, tongue out, shuddering in angry frenzy. Cain sat back on its tarsi, hissed and menacingly reached forward its needle-sharp talons. I put my body between eaglet Cain and eaglet Abel, and quickly eased Abel into the zippered pouch—he fitted nicely—and zipped it closed. Švehlik hauled away, then descended, and we carried off the ungrateful Cain, pecking angrily at the hand that but a week before had fed it its daily portion of cut up rats and mice.

"It shows no recognition!" Švehlik said with satisfaction. "We did not make it tame—and that is good."

We emerged from the forest, put the bird onto the front seat of the car, and drove rapidly toward Kosice—staving off Cain's curse from the sibling eaglets that had been our concern for that day.

An ornithological triumph: Two lesser spotted eagles peacefully share single nest before fledging.

It takes energy to get energy; the law of diminishing returns is in effect

The elephantine *Great Eastern,* designed for nonstop voyages from England to Australia, required more

In the mid-19th century, a British company launched the *Great Eastern,* a coal-fired steamship designed to show the prowess of Britain's industrial might. The ship, weighing 19,000 tons and equipped with bunkers capable of holding 12,000 tons of coal, was to voyage to Australia and back without refueling. But it was soon discovered that to make the trip the ship would require 75 percent more coal than her coal-storage capacity—more coal, in fact, than the weight of the ship herself.

Today the United States is embarking on an effort to become independent in energy production, and such a program deserves the kind of analysis that the British shipbuilders overlooked. Indeed, our civilization appears to have reached a limit similar to that of the *Great Eastern*: The energy which for so long has driven our economy and altered our way of life is becoming scarce, and a number of respected experts are suggesting that, without significant changes, our society will go the way of the ship that needed more fuel than it could carry.

In recent years, energy growth in the United States has expanded at a rate of nearly four percent per year, resulting in a per capita consumption of all forms of energy higher than that of any other nation. U.S. energy consumption in 1970 was half again as much as all of Western Europe's, even though Europe's population is one-and-a-half times ours.

As energy consumption has increased in this nation, our energy resources have drastically declined. According to M. King Hubbert, a highly respected energy and resource expert, the peak for production of all kinds of liquid fossil fuel resources (oil and natural gas) was reached in this country in 1970 when almost four billion barrels were produced. "The estimated time required to produce the middle 80 percent [of the known reserves of this resource]," Hubbert says, "is the 61-year period from 1939 to the year 2000, well under a human lifespan."

As available domestic oil and gas resources have declined, we have turned more and more to foreign imports—but, since 1973, the price of this essential imported oil has quadrupled. Recoiling from the specter of another embargo, federal officials and industrialists have suggested that the nation develop alternative energy sources such as nuclear power, and fossil fuels such as coal and oil shale, to bridge the energy gap and enable the nation to become self-sufficient.

According to John Sawhill, former chief of the Federal Energy Administration, "the repercussions of Project Independence will be felt throughout our economy. It will have a dramatic impact on the way 211 million Americans work and live." The price tag placed on pursuing the energy goals of Project Independence has been estimated to fall somewhere between $500 billion and $1 trillion. Raising such capital for energy development may prove to be the greatest

Wilson Clark, a Washington consultant, has written often in SMITHSONIAN *about alternative energy sources. His book,* Energy for Survival, *is just out.*

When economics and energy flows are combined, some analysts see the dollar value of a tree and an end to industrial growth

By Wilson Clark

Illustrations by Jan Adkins

coal than the ship could carry. Some experts are beginning to wonder if we aren't in the same boat.

financial undertaking in the history of the United States. A growing number of experts, however, say the goal of Project Independence may be unreachable.

The central problem is simply that *it takes energy to produce new energy*. In other words, in every process of energy conversion on Earth, some energy is inevitably wasted. The laws of thermodynamics, formulated in the last century, might be viewed as describing a sort of "energy gravity" in the universe: energy constantly moves from hot to cold, from a higher to a lower level. Some energy is free for Man's use—but it must be of high quality. Once used, it cannot be recycled to produce more power.

Coal, for example, can be burned in a power plant to produce steam for conversion into electric power. But the resulting ashes and waste heat cannot be collected and burned to produce yet more electricity. The quality of the energy in the ashes and heat is not high enough for further such use.

Numerous studies have indicated that the United States has enormous reserves of fossil fuels which can provide centuries of energy for an expanding economy, yet few take into account the thermodynamic limitations on mining the fuels left. Most cheap and accessible fossil fuel deposits have already been exploited, and the energy required to fully exploit the rest may be equal to the energy contained in them. What is significant, and vital to our future, is the *net* energy of our fuel resources, not the *gross* energy. Net energy is what is left after the processing, concentrating and transporting of energy to consumers is subtracted from the gross energy of the resources in the ground.

Consider the drilling of oil wells. America's first oil well was drilled in Pennsylvania in 1859. From 1860 to 1870, the average depth at which oil was found was 300 feet. By 1900, the average find was at 1,000 feet. By 1927, it was 3,000 feet; today, it is 6,000 feet. Drilling deeper and deeper into the earth to find scattered oil deposits requires more and more energy. Think of the energy costs involved in building the trans-Alaska pipeline (see SMITHSONIAN, October 1974). For natural gas, the story is similar.

Dr. Earl Cook, dean of the College of Geosciences at Texas A. & M. University, points out that drilling a natural gas well doubles in cost each 3,600 feet. Until 1970, he says, all the natural gas found in Texas was no more than 10,000 feet underground, yet today the gas reserves are found at depths averaging 20,000 feet

To maintain the average American at present comfort levels requires 21,600 pounds of nonmetal resources such as sand and gravel and salt, 1,450 pounds of metal substances and 18,600 pounds of fossil fuels, plus

and deeper. Drilling a typical well less than a decade ago cost $100,000 but now the deeper wells each cost more than $1,000,000 to drill. As oilmen move offshore and across the globe in their search for dwindling deposits of fossil fuels, financial costs increase, as do the basic energy costs of seeking the less concentrated fuel sources.

Although there is a good deal of oil and natural gas in the ground, the net energy—our share—is decreasing constantly.

The United States has deposits of coal estimated at 3.2 trillion tons, of which up to 400 billion tons may be recoverable—enough, some say, to supply this nation with coal for more than 1,000 years at present rates of energy consumption. And since we are dependent on energy in liquid and gaseous form (for such work as transportation, home and industrial heating), the energy industries and the Federal Energy Administration have proposed that our vast coal deposits be mined and then converted into gas and liquid fuels.

Yet the conversion of coal into other forms of energy, such as synthetic natural gas, requires not only energy but large quantities of water. In fact, a panel of the National Academy of Sciences recently reported that a critical water shortage exists in the Western states, where extensive coal deposits are located. "Although we conclude that enough water is available for mining and rehabilitation at most sites," said the scientists, "not enough water exists for large-scale conversion of coal to other energy forms (*e.g.*, gasification or steam electric power). The potential environmental and social impacts of the use of this water for large-scale energy conversion projects would exceed by far the anticipated impact of mining alone." In fact, the energy and water limitations in the Western states preclude more than a fraction of the seemingly great U.S. coal deposits from ever being put to use for gasification or liquefaction.

The prospects for oil shale development are not as optimistic as some official predictions portend. Unlike oil, which can be pumped from the ground relatively easily and refined into useful products, oil shale is a sedimentary rock which contains kerogen, a solid, tarlike organic material. Shale rock must be mined and heated in order to release oil from kerogen. The process of mining, heating and processing the oil shale requires so much energy that many experts believe that the net energy yield from shale will be negligible. According to *Business Week,* at least one major oil company has decided that the net energy yield from oil shale is so small that they will refuse to bid on federal lands containing deposits. And even if a major oil-shale industry were to develop, water supplies would be as great a problem as for coal conversion, since the deposits are in water-starved Western regions. The twin limiting factors of water and energy will preclude the substantial development of these industries.

Nuclear power is seen as the key to the future, yet an energy assessment of the nuclear fuel cycle indicates that the net energy from nuclear power may be more limited than the theoretically prodigious energy of the atom has promised.

Conventional nuclear fission power plants, which are fueled by uranium, contribute little more than four percent of the U.S. electricity requirements at present, but according to the Atomic Energy Commis-

a little less than one ounce of uranium each year. That amount of energy, nearly twice what the average European uses in a year, is the equivalent of each citizen having 300 slaves working 24 hours per day.

sion, fission will provide more than half of the nation's electricity by the end of the century. Several limitations may prevent this from occurring. One is the availability of uranium ore in this country for conversion to nuclear fuel. According to the U.S. Geological Survey, recoverable uranium resources amount to about 273,000 tons, which will supply the nuclear industry only up to the early 1980s. After that, we may well find ourselves bargaining for foreign uranium, much as we bargain for foreign oil today.

According to energy consultant E.J. Hoffman, however, an even greater problem with nuclear power is that the fuel production process is highly energy-intensive. "When all energy inputs are considered," he says, such as mining uranium ore, enriching nuclear fuel, and fabricating and operating power plants and reprocessing facilities, "the net electrical yield from fission is very low." Optimistic estimates from such sources as the President's Council on Environmental Quality say that nuclear fission yields about 12 percent of the energy value of the fuel as electricity: Hoffman's estimate is that it yields only 3 percent. That advanced reactors might have a higher net yield is one potential, but largely unknown at present, since such reactors have not yet been built and operated commercially. Other nuclear power processes, such as nuclear fusion, have simply not yet been shown to produce electricity, and so they cannot be counted upon. Even the more "natural" alternative energy sources, such as solar power, wind power and geothermal power, have not been evaluated from the net energy standpoint. They hold out great promise—especially from a localized, small-scale standpoint. Solar energy, for example, is enormous on a global scale but its effect varies from one place to another. However, the net energy yield from solar power overall might be low, requiring much energy to build elaborate concentrators and heat storage devices necessary.

What about hydrogen as a replacement fuel? By itself, hydrogen is not at all abundant in nature, and other energy sources must first be developed to power electrolyzers in order to break down water into hydrogen and oxygen. The energy losses inherent in such processes may result in a negligible overall energy yield by the time hydrogen is captured, stored and then burned as fuel. An indication of the magnitude of this problem has been given by Dr. Derek Gregory of the Institute of Gas Technology in Chicago, who points out that to substitute hydrogen fuel fully for the natural gas currently produced would require the construction of 1,000 enormous one-million-kilowatt capacity electric power plants to power electrolyzers—more than twice the present entire installed electrical plant capacity of the nation.

While much of this kind of analysis is apparently new to most energy planners, it also represents more than an analogy to the cost-accounting that is familiar to businessmen investing dollars to achieve a net profit. The net energy approach might provide a new way of looking at subjects so seemingly disparate as the natural world and the economy.

Dollar values of natural systems

An outspoken proponent of the net energy approach is Dr. Howard T. Odum, a systems ecologist at the University of Florida. In the 1950s, Odum analyzed the work of researchers trying to grow algae as a cheap source of fuel, and found that the energy required to build elaborate facilities and maintain algae cultures was greater than the energy yield of the algae when harvested for dry organic material. The laboratory experiment was subsidized, not by algae feeding on free solar energy—which might have yielded a net energy return—but by "the fossil fuel culture through hundreds of dollars spent annually on laboratory equipment and services to keep a small number of algae in net yields."

With his associates at the University of Florida, Odum began to develop a symbolic energy language, using computer-modeling techniques, which relates energy flows in the natural environment to the energy flows of human technology.

Odum points out that natural sources of energy—solar radiation, the winds, flowing water and energy

Some ecologists believe swamps could recycle urban wastes as well as treatment plants do—with no fuel.

stored in plants and trees—have been treated as free "gifts" rather than physical energy resources which we can incorporate into our economic and environmental thinking. In his energy language, however, a dollar value is placed on all sources of energy—whether from the sun or petroleum. To produce each dollar in the economy requires energy—for example, to power industries. The buying power of the dollar, therefore, can be given an energy value. On the average, Odum calculates, the dollar is worth 25,000 calories (kilocalories, or large calories) of energy—the familiar energy equivalent dieters know well as food values. Of this figure, 17,000 calories is high-quality energy from fossil fuels and 8,000 calories low-quality energy from "natural" sources. In other words, the dollar will buy work equal to some mechanical labor, represented by fossil fuel calories, and work done by natural systems and solar energy.

Odum's concept of energy as the basis of money is not new; a number of 19th-century economists thought of money or wealth as deriving from energy in nature. The philosophy was expounded earlier in this century by Sir Frederick Soddy, the British scientist and Nobel Laureate, who wrote that energy was the basis of wealth. "Men in the economic sense," he said, "exist solely by virtue of being able to draw on the energy of nature. . . . Wealth, in the economic sense of the physical requisites that enable and empower life, is still quite as much as of yore the product of the expenditure of energy or work."

Odum views natural systems as valuable converters and storage devices for the solar energy which triggers the life-creating process of photosynthesis. Even trees can be given a monetary value for the work they perform, such as air purification, prevention of soil erosion, cooling properties, holding ground water, and so on. In certain locations, he says, an acre of trees left in the natural state is worth more than $10,000 per year or more than $1 million over a hundred-year period, not counting inflation. Last year, he calculated that solar energy, in conjunction with winds, tides and natural ecological systems in the state of Florida, contributed a value of $3 billion to the state, compared to fossil fuel purchases by the state's citizens of $18 billion per year.

The value of the natural systems to the state had never before been calculated. "These parts of the basis of our life," says Odum, "continue year after year, diminished however, when ecological lands that receive sun, winds, waves and rain are diverted to other use." He is now developing a "carrying capacity" plan for the future development of the state which has attracted the interest of the state legislature.

Odum's work may lead to eminently practical applications, by indicating directions in which our society can make the best use of energy sources and environmental planning. One application is to use natural systems for treating wastes, rather than using fossil fuels to run conventional waste-treatment plants. "There are," he says, "ecosystems capable of using and recycling wastes as a partner of the city without drain on the scarce fossil fuels. Soils take up carbon monoxide, forests absorb nutrients, swamps accept and regulate floodwaters." He is currently involved in a three-year program in southern Florida to test the capability of swamps to treat wastes, and demonstrate their value to human civilization as a natural "power plant." The work, supported by the Rockefeller Foundation and the National Science Foundation, has drawn the attention and interest of many community and state governments.

According to Odum's energy concepts, a primary cause of inflation in this country and others is the

If dollars buy work and work takes energy, the value of a dollar can be calculated in terms of energy.

pursuit of high economic growth with ever-more costly fossil fuels and other energy sources. As we dig deeper in our search for less-concentrated energy supplies to fuel our economy, the actual value of our currency is lessening. "Because so much energy has to go immediately into the energy-getting process," he notes, "then the real work to society per unit of money is less."

Economists, who generally resent intruders on their turf, have not embraced this equation of energy and money with much enthusiasm, but it is gaining adherents in several quarters. According to Joel Schatz of Oregon's energy planning office, Odum's work leads the way toward effective government planning in this age of economic uncertainty. "The more successful the United States is in maintaining or increasing its total energy consumption," he says, "under conditions of

To the credit of live tree posts

Present-day ecologists are by no means the first to see the value—the dollar value—in employing natural systems to do work for Man. Discussing the introduction of wire for fencing into the United States, Eric Sloane, in his book *Reverence for Wood,* mentions an address that was read before the Philadelphia Agricultural Society on January 2, 1816.

"The 1816 account spoke of 'living trees connected with rails of wire,' and true to the early American philosophy of looking far ahead, it compared the cost of wire fencing with wood fencing over a period of fifty years. It came to the conclusion that there was a cash saving of $1,329 per hundred acres enclosed. The plan, however, was indeed unique for it enabled the fence to *earn money!* Why plant dead posts in the ground and wait for them to rot? Why not plant live trees instead and let them bear fruit and nuts and firewood which would then give profit to the farmer? Using a hundred acres as an example, the Society suggested the following plan of live tree posts and showed what they might earn a farmer within fifty years (allowing no harvest for the first ten years of growth):

244 apple trees producing	$1 per year	$ 244
30 cherry trees	" 50¢ per year	15
20 pear trees	" 50¢ per year	10
10 plum trees	"	3
10 shellbark trees	"	10
50 chestnut trees	"	12
5 butternut trees	"	20
5 English walnuts	"	5
20 walnut trees	"	5
250 buttonwood trees (24 cords firewood taken from tops)		72
		$ 396
multiplied by 40 years' harvests		$15,840
deduct the cost of wire rails		1,751
to the credit of live tree posts and wire fence in 50 years		$14,089"

declining net energy, the more rapidly inflation, unemployment and general economic instability will increase." Many people currently consider this disruption only an economic crisis, says Schatz, rather than what he believes it really is: a symptom of a continuing and deepening energy crisis.

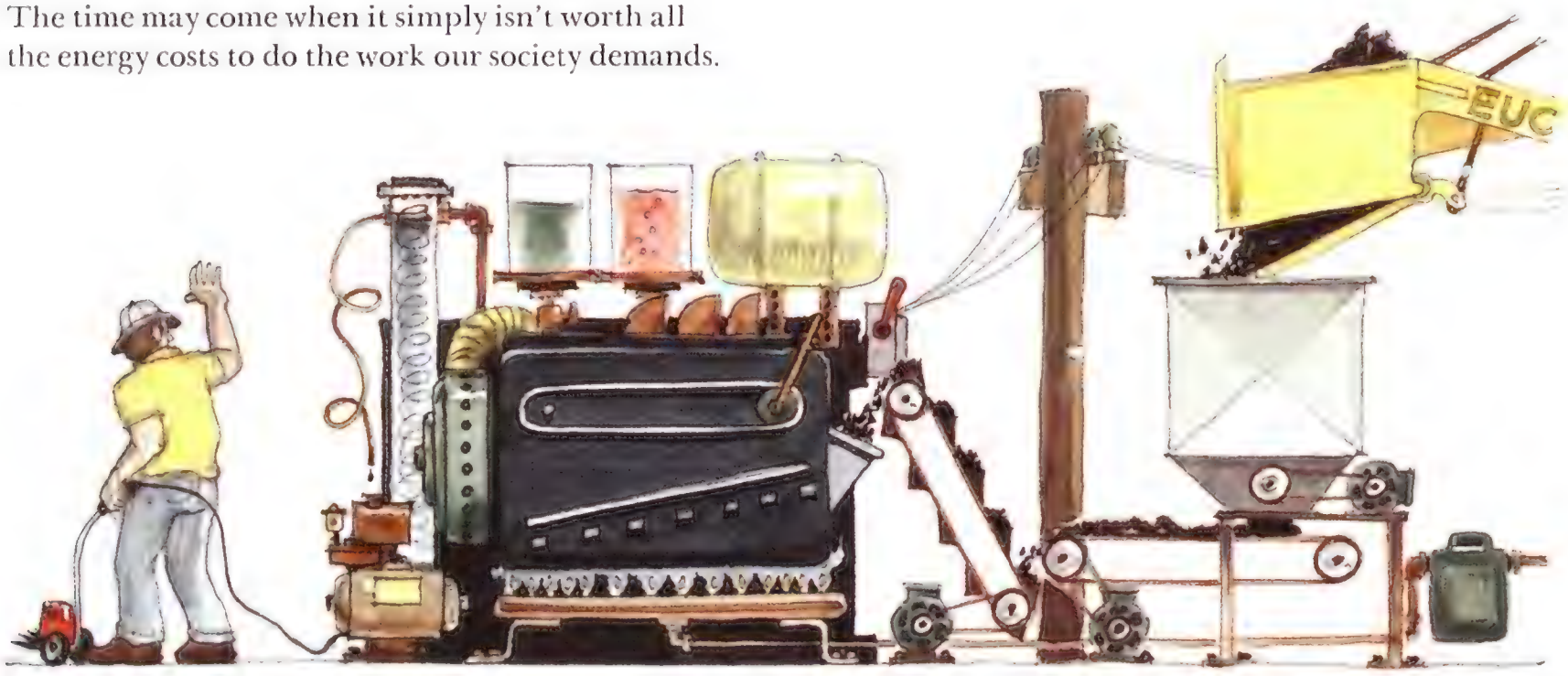
There are signs that the net energy approach is being taken seriously even by the architects of Project Independence. Eric Zausner of the Federal Energy Administration says that net energy is a "useful concept" which is under investigation. "Net energy flows," he adds, "have practical implications in the new and exotic fuels, such as oil shale. With coal, there is no issue, since there is a net output of energy. But some of the new processes, such as shale oil processing in situ, net energy flow is a very important consideration in whether we should do it or not."

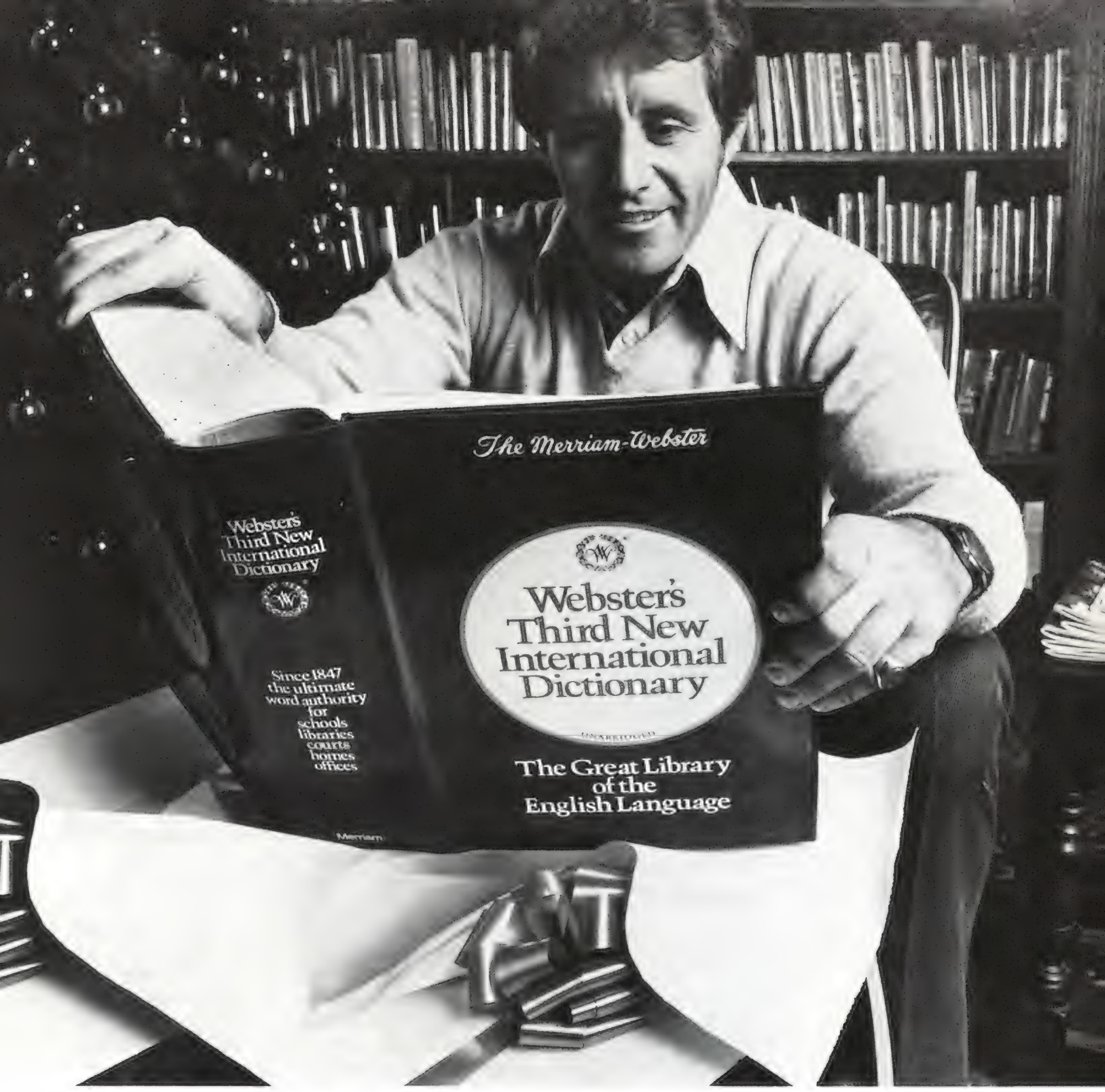
Congressman George Brown jr, a physicist from Southern California and one of a bare handful of scientifically trained members of Congress, goes much further. He believes that the new Office of Technology Assessment in the Congress should undertake a broad energy analysis, encompassing the net energy approach, of the widespread implications of the administration's plans for Project Independence. "We must start with the assumption that the energy available to do work is declining. This one assumption, which is firmly based on the laws of physics, will revolutionize economic policy once its truth becomes known. . . . The implications of the limits to growth of our economic systems are just beginning to be understood," says Congressman Brown, pointing out that the net energy approach indicates the inevitability of a national shift of emphasis toward a steady-state economy. "While this view is not yet widely held in Congress, the ranks of advocates are growing."

Since the Industrial Revolution, the Western world has been engaged in a great enterprise—the building of a highly complicated technological civilization. The Western "growth" economy (which today also characterizes Japan) has been made possible by seemingly endless supplies of inexpensive energy. One implication of the net energy approach is that a vigorous and wide-reaching conservation program may be the only palliative for inflation.

Another implication is that the days of high growth may be over sooner than most observers have previously thought. For it is increasingly apparent that today's energy crisis is pushing us toward a "steady-state" economy: No one yet knows what such an economy will look like or what social changes will result. But it would seem to be about time to start thinking seriously about it.

The time may come when it simply isn't worth all the energy costs to do the work our society demands.

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Henry Ford paces the deck of *Oscar II*, sporting the sable collar which helped save his life.

By J. Timberlake Gibson

Henry Ford's peace ship: not a better idea

It seemed simple to the manufacturer: The Great War displeased him, so he would tell the men in the trenches to stop it

Henry Ford is not remembered as a diplomat. But in 1915, when the Kaiser was stalemated in Western Europe, Ford briefly forsook automobiles and surfaced with his own brand of diplomacy. He became "Superdove," using what he had most of—money—to try to bring peace to a warring world.

At 52, Henry Ford was a combination of Will Rogers, a contrived but sharp-witted hayseed; of Carry Nation, a tiresome moral crusader; and of Phineas T. Barnum, a showman who too often believed the myths he created. Barnum could not have come up with a greater spectacular than the Great Peace Ship which Ford launched to stop World War I.

By the end of 1915 it was increasingly evident that the United States ultimately would be involved in this fearsome struggle which at first seemed none of our concern. Many Americans hoped and prayed and bought the newspapers which printed the daily peace proposals. Wiser heads realized that the Central Powers would negotiate only when their enemies were completely crushed—a definite possibility at that time.

Ford, meanwhile, was riding the crest of success. The flivver king had an embarrassment of riches, yet still yearned for the common virtues of his rural childhood. Man, he told himself comfortably, was innately good; it was the monied "interests" (of which he was one) who debauched mankind and caused war. He felt that the diplomats were doing nothing, that capitalists on both sides nurtured a situation which filled their pockets with gold. To stop the killing Ford must somehow

Faith, Hope and Charity, accompanied by dove, sing "We don't know where we're going. . . ."

get the true story to the poor fools who were doing the fighting. There must be a way.

There was. There was a woman with a blueprint to accomplish exactly what Ford wanted. Rosika Schwimmer, a Hungarian journalist and pacifist, was in the United States lecturing at various peace conventions, hoping someone would listen to her. When she heard that Ford would give his fortune to stop the war, she hastened to Dearborn, Michigan.

Mme. Schwimmer had all the necessary qualities for success: She was humorless, tireless, fearless, shrewd and insensitive. Of medium height with dark curly hair, she could simulate a demure hausfrau or Lizzie Borden, as the occasion demanded (see page 94). When she tried to see Ford, his aides, recognizing an attractive nuisance when they saw one, refused her admission. But through some mistake she managed to see him anyway. He instantly fell under her spell.

She believed that the belligerents must agree to mediation by neutral powers. She maintained that the leaders of each side were wildly desirous of an accommodation, and she carried the proof in her little black bag. Louis Lochner, another pacifist who had joined Ford's entourage, agreed with her—America (meaning Ford) should launch a ship, which would immediately be known as a *peace* ship. The passengers would be prominent men and women of goodwill who would be available as mediators. They would constitute a hard peace core too important to be ignored.

Mme. Schwimmer was ready with a list of "personages," and it would be divulged in due time. Their ultimatum—"Stop the War!"—would unite the victimized populations of the world, and they would demand peace negotiations immediately. The warring powers would be shamed into sending delegates.

Ford went for the idea. He clearly saw that he had been charged with the mission to end the Great War. He sent Mme. Schwimmer to New York to get the project moving. He would follow to take the bows.

He was already getting a big press. The *New York Times* announced: "Ford Condemns War—Blames Capitalism. Not a Capitalist Himself, He Explains, Because 'I Earn My Living Honestly. . . . Take away the capitalist and you will sweep war from the earth.' " Less quotable were his anti-Jewish blockbusters: Jews were to blame for keeping the poor soldiers in the front lines. Mme. Schwimmer, a Jew herself, with her eye on the big piece of cake, ignored such talk.

By November 21, Ford had secretly secured the lease of a ship, *Oscar II,* from the Scandinavian-American Line for a reported $49,000. He left for Washington to offer President Wilson the opportunity of getting into the act. The President, less than overjoyed by the news of Ford's ego trip, received the "non-capitalist" politely but his warmth quickly cooled. Ford, all folksy, his Will Rogers self, with leg slung over the arm of his chair, suggested that the President should appoint a Peace Commission, presumably to sail on *Oscar.*

With ex-President Theodore Roosevelt demanding instant intervention for the Allies (SMITHSONIAN, October 1973) and a Presidential election due the following year, Wilson didn't need amateur diplomacy, no matter how well intended. His answer was a firm "no" and an even firmer "adieu." Ford was not used to being dismissed. Once outside the White House, he snapped, "He's a small man."

Thus far Ford had made no outstanding boners. But suddenly he began to talk without thinking. On November 24, he verified, at a hastily called press conference, that he had leased a ship and added that he intended "to try to get the boys . . . back to their homes by Christmas Day." Reason persuaded him to amend this to "out of the trenches by Christmas." A few days later he had a better idea—wire the boys in the trenches to strike. He was not explicit as to what boys. Just the Allies? From here on the Peace Ship began to seem more and more rudderless.

Publicity about *Oscar II* continued to saturate the papers. Public and press alike were sick of disaster and could use a laugh. They didn't have long to wait. Mme. Schwimmer's "Peace Delegate" invitation list was published. The Number-One attraction was to be

Mr. Gibson described postcards in April's SMITHSONIAN *and the Lafayette Escadrille in December 1972.*

the controversial William Jennings Bryan, ex-Secretary of State, who was waging a battle of vituperation against the President. Also invited were Jane Addams, pioneer social worker of high repute; Luther Burbank, the distinguished naturalist; Cardinal Gibbons, the Roman Catholic prelate; Ford's friends, John Wanamaker and Thomas Edison; Margaret Wilson, the President's daughter; 48 state governors; anyone else whom Rosika fancied.

Most declined. A "B" list was quickly whipped up, which was so badly screened that no one knew just exactly who was invited.

Nevertheless, *Oscar II* made ready to sail on schedule December 4th, and the B list and their friends jammed the pier in Hoboken. Henry stood on the deck waving to the crowds below, but he must secretly have felt pangs of apprehension. Indisposed or previously engaged were the VIPs who were to have worked the "moral suasion" on the bellicose governments and their captive peoples. Actually, the much-desired Jane Addams was sick, but the rest?

Of 48 state governors, only Governor Hanna of North Dakota showed. There were about 83 delegates (the exact number is still a mystery), most of them without enough prestige to influence an Elks' picnic. The elusive Bryan showed to well-wish, but alas, President Wilson remained behind. Dr. Charles Griffin Pease, head of the Anti-Smoking League, arrived with his "secretary" but was denied access at the last minute because Ford heard that the couple wasn't married. Judge Ben B. Lindsey, who had parlayed trial marriage and juvenile delinquency into a good thing (he was against the latter), showed up. Nearby stood the Reverend Jenkin Lloyd Jones, who looked and acted like Santa Claus and whiled away the pre-sailing moments by presiding at the marriage of Berton Braley, "the Hobo Poet." Braley had decided to combine peace pilgrimage and honeymoon, but had somehow forgotten to get married beforehand.

Also on the passenger list was Samuel B. Marquis, Dean of Detroit's Episcopal cathedral, who went along as a sort of super-nursemaid for Henry. He carried a letter from Ford's wife Clara, which said, "Now, Henry, you follow the advice of Dr. Marquis. He is discreet and wise." Marquis proved to be both, and also Mme. Schwimmer's nemesis. He worked ceaselessly at one objective: "Henry, go home."

As *Oscar II* drifted downstream there was a great splash, a hue and cry, and a man could be seen flailing the murky waters. It was a Mr. Urban Ledoux, who told the bemused press that he was "swimming to reach public opinion." Despite such low comedy, the sailing was a triumph. Barely three weeks had elapsed between the birth of the idea and its execution: a tribute to Henry Ford, who knew how to use money and machines, and to Rosika Schwimmer, who knew how to use Henry Ford. And, no matter how crazy the venture appeared, a few saw it as a symbol of hope.

In his account, *The Odyssey of Henry Ford and the Great Peace Ship,* Burnet Hershey, a young reporter, tells how he saved Ford's life. One day as *Oscar* rolled and pitched, Hershey, near extinction with mal de mer, spotted Ford on the top deck sporting his sable-collared coat, his derby and his gold-handled cane. Suddenly a big wave caught Henry by surprise and sent him skidding to starboard in an inch of water

Rosika Schwimmer, Hungarian pacifist and feminist—and "mother" of the peace plan.

toward an unrailed opening between some lifeboats. Hershey "grabbed him by the first part that came handy—the sable collar—and got him back on his feet." He speculated that he might rate a "tin lizzie" for services rendered. As a matter of fact, he did receive a luncheon invitation 18 months later.

Teetotaling Ford vs. hard-drinking press

After the initial elation of sailing, the delegates and press separated into cliques while enjoying all the creature comforts at Ford's expense. Most of the serious delegates who were physically able to leave their cabins convened with Mme. Schwimmer, organizing for the great moments to come. The anti-delegate, anti-peace-ship press formed the "Ancient and Honorable Order of the Vacillating Sons of St. Vitus," a merry group which included such present and future notables as Elmer Davis (*New York Times*); S. S. McClure (*New York Daily Mail*); and William C. Bullitt (*Philadelphia Ledger*). Ford, Dean Marquis and Gaston Plantiff, Ford's business manager and general factotum, kept aloof. The extensive drinking and smoking began to irritate Ford more than the war. Once, spotting an employee at the bar, he swooped down like a Michigan twister and barked, "You cut out the booze on this trip or I'll have you fired."

As the voyage progressed, "the Ark of Peace," though propelled by the heady fuel of self-righteousness, rocked with discord. President Wilson's Third Annual Message with the Preparedness Proclamation (S. S. McClure produced an advance press copy) destroyed the last semblance of unity, dividing the delegates sharply on the issue of preparedness. As usual, tough and resourceful Mme. Schwimmer carried the day. Her faction passed an *anti*-preparedness motion. The press, now more antagonistic than ever, wrote lurid accounts of insurrection and mutiny, and one reporter carried a sensational scoop: "Ford a Prisoner in his Cabin, Chained to Bed by Secretary." They were all false, of course, the wish being father to the thought. Bullitt, later U.S. Ambassador to Moscow, dubbed Ford "the tenderest of the tender and the vaguest of the vague, a comic, charming child." This imagery was promoted by Ford and his staff. Actually, he was about as tender as whip leather and about as charming as a Marine top sergeant.

The Tenderest of the Tender wasn't shipping well. The rough weather, his near disaster at sea and a stiff bout with *la grippe* all combined to depress him to a point where he became much more amenable to the constant Henry-go-home pressure applied to him by Dean Marquis. The bickering of press and delegates increased his depression.

As the ship neared the northern tip of the British Isles, excitement rose. So close was the destination where the delegates would be hailed like heroes. But no one hailed *Oscar* except the Royal Navy, which instituted an immediate search for contraband. The wireless was "sealed"— a euphemism for heavy censorship. The detention, minus booze and baths, and the sudden realization that they must sail through submarine-infested waters, made many delegates weak from other causes than flu. However, the prospect of the surging crowds of welcome at Christiania (now Oslo), as depicted by Mme. Schwimmer, helped buoy sagging spirits. Henry made a pronouncement: "Wait until I land and watch developments."

Ford takes a constitutional with Dean Marquis, his "super-nursemaid" for the voyage.

Oscar glided into Christiania harbor about 5 A.M.; it was met by a monumental freeze. The crowd was zero, the temperature 12 below. By 9 A.M. 12 Norwegians showed—press and minor officials. It soon became apparent that Norway, scared out of its wits by the fate of neutral Belgium, was all-out for preparedness and suspicious of Mme. Schwimmer. She was treated like a bush-league Mata Hari. Oh, where was the tumultuous welcome? The heady applause?

As far as Ford was concerned, the show was over. Because of a long walk through the snow in the bitter weather, his flu recurred, and he remained in his suite at the luxurious Grand Hotel, a virtual prisoner of the assiduous Dean Marquis. But Henry still had one more run in him. On December 22 he announced a gift of $10,000 for university students to build a social

hall, and also promised to appear personally soon. The largesse, as always, got him a good press while the pushy Mme. Schwimmer, who had put him up to it, continued to get only kicks.

But Henry, homesick, weakened by flu and nagged relentlessly by Marquis, wanted out. He could hardly wait to see Clara, his assembly line, and the good old USA. Amid the uproar of the delegates, Henry and his bodyguard sneaked out of the hotel in the wee hours of December 23. Perhaps he wanted to forget the whole thing, but at least he remembered that he was responsible for his flock of doves (the delegates) and vultures (the press), who found themselves far from home on a bitterly cold Christmas day. They had spent $7,500 Christmas shopping and $2,000 on taxis and charged it all to Henry. What they hadn't heard yet was that he had also provided money for the completion of the mission and for return tickets. One delegate estimated that the expedition cost him less than 1/20th of a year's interest on his capital.

Although Henry's departure was a blow to the delegates, and especially to Mme. Schwimmer, they had gathered enough momentum to carry on, secure in the knowledge that Ford was still feeding the kitty. The mission was enthusiastically received in Stockholm, Copenhagen and The Hague, where its members were billeted in a temperance hotel—no smoking either. Someone had a sense of humor. Possibly H.F.

What did Ford get out of his expedition? Very little "peace" but prospects of a huge postwar tractor market in Russia. Also, his name was immortalized in the word "*Fordisme*"—a French concoction meaning "direct action by cutting through red tape."

And Mme. Schwimmer? She received her smidgen of immortality. Her ideas on "mediation and a just peace" were not too far off the points used to induce the Central Powers to surrender on November 11, 1918.

Cartoon by W. A. Rogers (above) is entitled "The Flivver at Sea." T. E. Powers marked the end of the venture (below) with "Enough is Enough."

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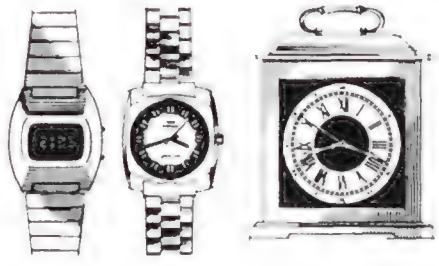

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Some little known facts about our ancestors

Were they warriors, kings, mystics, farmers? Did they live in Europe, Africa, Asia? Spend a few minutes and read about our ancestors . . .

What special talent did they have that no other creature of the earth possessed? Who was commanded by God to build an Ark? Why did the ancient Chinese reserve the southwestern corner of the house for the marriage bed?

5,000 years ago, he used picture writing to keep records of crops and livestock.

The special talent our ancestors had was an ability to make tools and weapons—and to constantly improve them.

The Old Testament tells of Noah. Sumerian tradition had its own Noah. According to this legend, a disastrous flood all but wiped out mankind and God ordered Ziusudra, a farmer, to build a boat of reeds so he and his family and their animals could survive the flood and repopulate the world.

The ancient Chinese stored their seed-corn just outside the southwestern corner of their houses. The dead, too, were buried close to this spot. To symbolize the family's links with the past and the future, it became the custom for marital intercourse to take place in this one corner.

Who were the mysterious Khapiru people? Did the caste system originate in India? How did Themistocles trick Xerxes at Salamis?

Excavations at Ras Shamra, north of the Syrian coast town of Latakia, have unearthed valuable stone tablets in the Ugartic language which refer to a heretofore-unknown group of semi-nomads called the Khapiru. They had their own God — Yahweh or Jehovah —and had ethnic links with the Aramaens and other Semitic groups. Later, Moses would unite them. They were the Hebrews.

The caste system did not originate in India. It was imported by the Aryan nomads when they invaded the Indus valley and the Punjab, 3,721 years ago.

Themistocles' trick? It was used against the Persian king Xerxes. Xerxes' huge army and navy had encircled Themistocles' beloved Athens. The leader of the Athenians secretly sent a letter to Xerxes. In it, Themistocles told Xerxes that the Athenians were quarreling among themselves. That most of them would desert if Xerxes attacked from both ends of the Straits of Salamis. Xerxes fell for the trick. He attacked. Trouble was, there wasn't room enough in the narrow straits for all his ships. They were sitting ducks for the Athenian navy. Defeated, Xerxes fled to Persia.

Is it true that Cleopatra bore the illegitimate child of Julius Caesar? In what single respect does Buddha's doctrine differ from the teachings of most of the other great religions of the world? Why is this year actually 1978 A.D — and not 1974?

Cleopatra was crowned Queen of Egypt by Julius Caesar in Rome in 44 B.C. She returned to Egypt, declaring that her son Caesarion was Caesar's.

Pyrrhus, whose army of Greek mercenaries won a great battle with Rome, but suffered so many casualties they retreated. Hence the term: a pyrrhic victory.

Knowing Caesar's reputation, historians doubt it.

Unlike the teachings of most of the other great religions of the world, Buddha's doctrine does not require belief in a supreme and omnipotent deity, or make any reference to such a being.

The Christian system of chronology still proclaims, even in a secular world, the decisive nature of the birth of Jesus. The *Anni Domini* (A.D.), the "years of the Lord", continues to designate our present era. When this system was adopted in the Sixth Century, however, there was a miscalculation and the

7 Important Questions Answered

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birth of Jesus was set at least four years too late. Thus, this year of 1974 is actually 1978 A.D.

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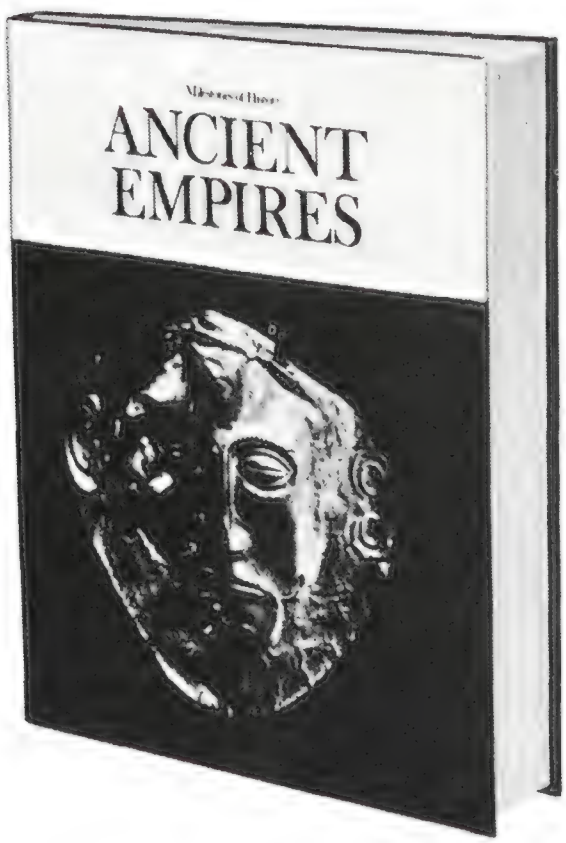

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- *Athens wins a sea battle*
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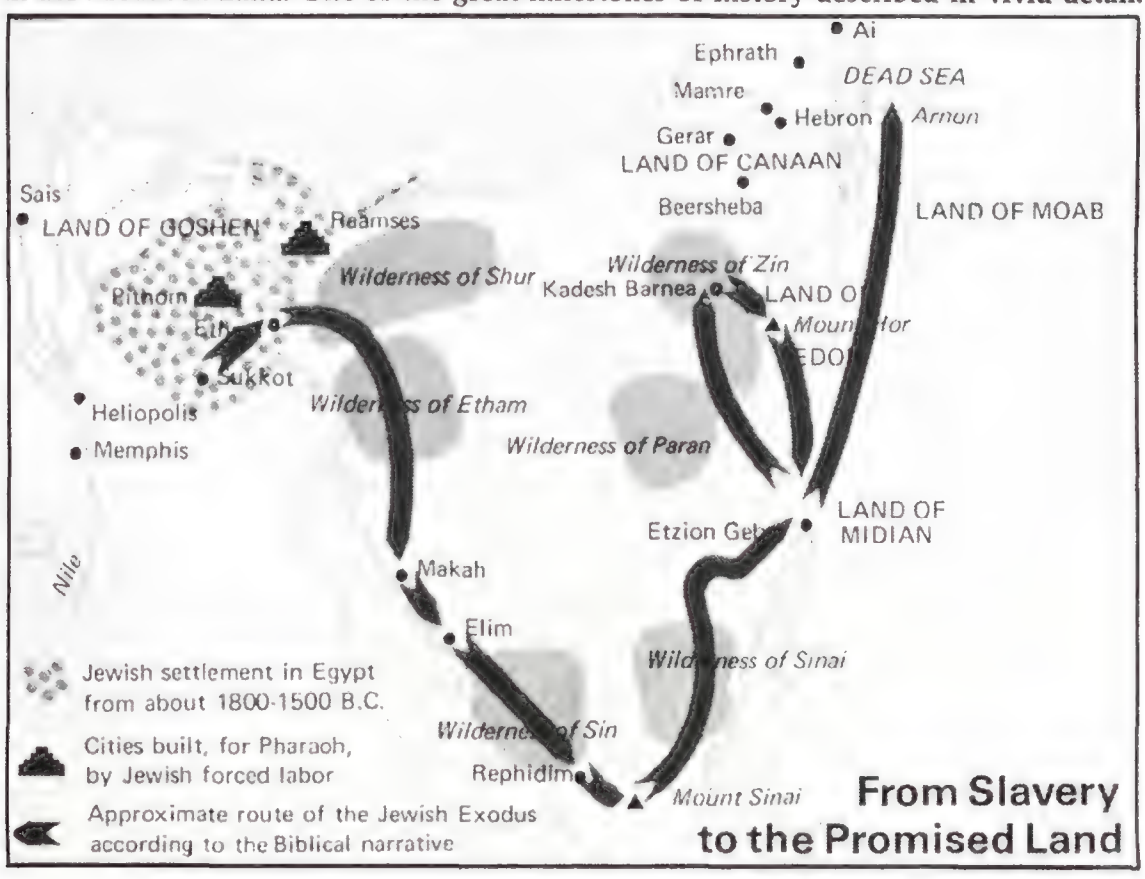

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Book reviews

The Popular Arts of Mexico
Kojin Toneyama
(Weatherhill, $55)

One of the greatest surprises and pleasures of Mexico is the seemingly inexhaustible variety of folk art to be found there, from plain and beautiful utensils to elaborate, fanciful decorations. An equal pleasure, and one reflected in the popular arts, is the variety and violence of colors everywhere, in the riotous brilliance of vegetation in season, in the stark contrast of a peasant woman's magenta skirt seen against umber hills, in the percussive, high-keyed diversity of market days and fiesta celebrations in cities, towns and villages across the land.

This sunny volume celebrates these facets of the Mexican setting and culture (see "The view from the castle," p. 6). Kojin Toneyama, its author, is perfectly suited to such a celebration by temperament and experience, managing to sustain his expert, understated narrative with a knowledgeable outsider's constant, keen sense of surprise. Toneyama, a Japanese artist, first visited Mexico 15 years ago to study the modern muralists. Obviously, he became fascinated with the strange totality of Mexican culture. This book, his fourth about Mexico, contains excerpts from Toneyama's journal and an afterward on techniques by Carlos Espejel, director of the country's national folk-arts museum, the Museo Nacional de Artes e Industrias Populares. But it is mostly joyous pictures in color—photographs of the artisans who make, wear and sell the popular art objects the book is about, the author's own colorful watercolor impressions of things and events, and impressively reproduced full-color illustrations of the objects.

A good deal of arduous travel is necessary to locate the best and the unique among Mexico's popular arts, and Toneyama, over the years, has traveled energetically. The author's journal, for instance, records trips to villages isolated in the rugged mountains of Nayarit, where Huichol women weave their famous and wondrously brilliant garments, and to an almost inaccessible village in the Sierra of Puebla where women still pound paper from bark of the amate tree, exactly as was done a thousand years ago. The book, then, provides something of the surrogate pleasures of all good travel books; more usefully, it can be employed as an authoritative (if not precisely comprehensive) guide to the genuine popular arts of Mexico. In a market that has become flooded with debased coinage produced for the immense, uncaring tourist trade, this is no mean assistance.

Petatillo-style pottery vessels (Tonalá).

There is, alas, this apparently ineluctable, dark undercurrent to Toneyama's celebration of the irresistible creativity of Mexican artisans. As Espejel tersely notes, in recent years there has been "a noticeable decline in workmanship" as demand has increased and as the sons and daughters of the artisans have moved from village to city and from the bonds of family tradition to some less rooted, modern citizenship. Toneyama himself tells of a time in Olinalá, a village in Guerrero noted for its lacquered dishes, jewelry,

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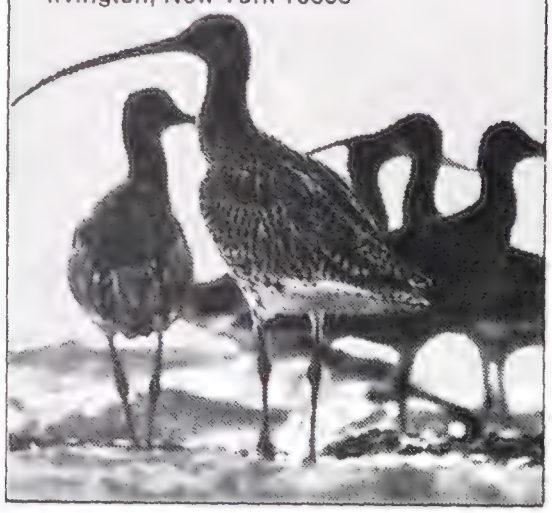

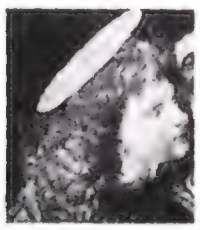

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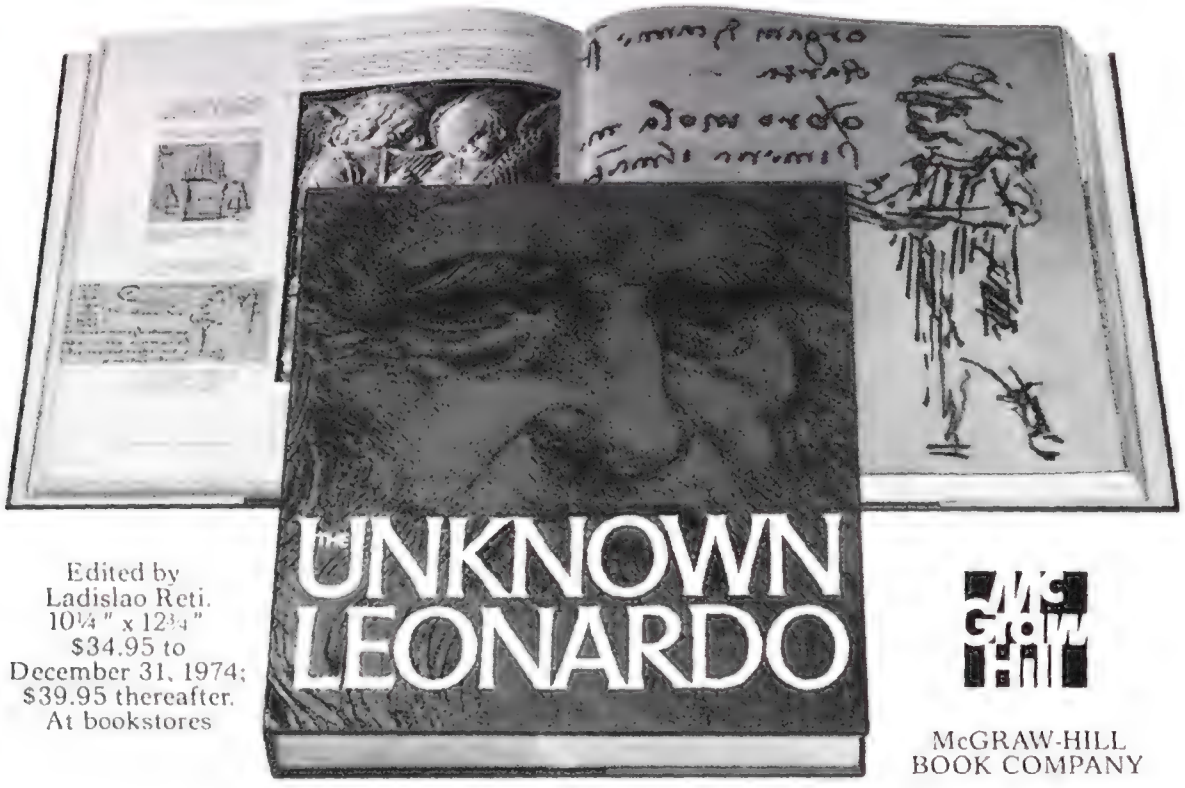

Edited by Ladislao Reti. 10¼" x 12¾" $34.95 to December 31, 1974; $39.95 thereafter. At bookstores

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boxes and chests, where a master craftsman, having observed the author's own bright sketches, offered him 40 pesos a day to stay there for a year to "teach us something new besides the plants, birds and animals that we have always used in our work." Toneyama writes, "I did not know what to say out loud, but I knew what answer I made in my heart. . . . 'I don't want you to start using all kinds of new things and losing the good things that you already have.'"

Still, the book itself testifies not only to the fecundity and fantasy of Mexican crafts and folk arts, but also to the resourcefulness of some contemporary Mexican artisans, who incorporate the new into the old with no loss of honesty or strength. On the evidence presented here, one is privileged to close the book with the feeling that if any people can do it, Mexicans can.

—*Benjamin Forgey*
Art critic, *Washington Star-News*

In The Ocean Wind
Cynthia Wayburn and Peter Scott
(Glenwood, $9.75)

In The Ocean Wind breathes with life: in the sea along the north coast of Santa Cruz in California, in tide pools, in Brussels sprouts fields, in goat paths which lead to cliff tops, on the misty island where Steller sea lions live.

And, in its poetry. "Each stone a hardened breath,/explain my genealogy in rocks,/tell me my name in the language of plants."

In The Ocean Wind is the offspring of what one editor terms "a love affair" with the coast, where "the clocks tick more slowly." The book began four years ago at the University of California at Santa Cruz as a project of "individual study," with academic credit toward a degree in environmental studies.

Cynthia Wayburn, who describes herself as an "environmental activist," and Peter Scott, physicist and teacher, edited the work of 17 persons who had something in common—they cared about the stunning Santa Cruz coast. The contributors include a land-use planner, housewife, artist, attorney, newspaper reporter, teachers, photographers and poets.

The few miles of craggy Pacific coast from Santa Cruz north to the 12-acre island of Año Nuevo face pressure—as do many areas of the country—for residen-

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tial development, freeways, atomic power plants. *In The Ocean Wind,* resisting that pressure, is a lulling breeze of drawings, essays, photographs, history, poetry, biology and memoirs.

Zoologist and teacher Todd Newberry provides a flat-on-his-stomach view of tide pools, a collage of mussels, goose barnacles, laminarian seaweed, anemones, sea squirts.

Biology professor Burney J. Le Boeuf tells of studying the elephant seal and of a visit to its island home on a cold, foggy day before Christmas. Earth sciences professor Gary Griggs writes of the coast's natural bridges, caves, rock terraces, sea cliffs, and of the littoral drift: a river of sand. Nan Flink's "Oceans Journal" is a solitary record of coastal life.

Morton Marcus offers selections from *The Santa Cruz Mountain Poems.* Some resemble Theodore Roethke's work, others speak calmly for themselves. "I trudge toward the dark./Behind me, my footsteps flutter up,/gold-edged in the late noon air,/and float toward the sun."

"Listening to the Oldest Man in the Room" is a luminous description of an 81-year-old man (who himself contributes to the book) speaking at a county commission meeting against residential development of 950 acres of ocean frontage.

"I have seen Eden," he says, and the audience—and the commissioners—appear spellbound. But the commission's reluctant reply—we can't put up a tollgate at the summit—goes to the crossroads of the dilemma: How can the north coast of Santa Cruz County be protected?

Land-use planner Celia Von der Muhll writes with clarity about the problem, but she, and most of the contributors, finish short of an answer, and all seem to know it. Public ownership of the coast, with a cheap lease to farmers? Buying and selling development rights? Easements? Careful planning? Tough zoning? Or, as one writer notes, the "only practical thing is an idealist's miracle."

Despite the quiet tone of the book ("the market is glutted with . . . long diatribes forecasting the doom of the earth," the preface notes), there is a zone of gloom. "Frankly, I don't think we are going to make it," writes one author. "Let us try to understand, for what the understanding is worth, that we are destroying the Santa Cruz coast every day in some part of the world. . . ."

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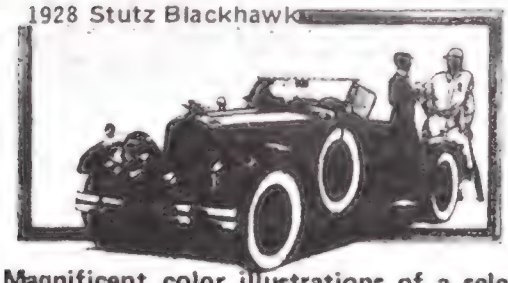

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which will be used "in the public purchase of endangered property" along the Santa Cruz coast, is perhaps one phase of that "idealist's miracle." Its contents already have preserved a part of the earth. And maybe the chairman of the Santa Cruz commission will read it.

—Henry Christner
Editor of *The Fauquier Journal*
in Virginia

The Golden Man:
A Quest for El Dorado
Victor W. von Hagen
(Saxon House, $13.95)

"The collective madness for the search of the Golden Man and the Golden City lasted for a full century. That is from the time that Sir Thomas More published, in 1516, his *Utopia* until 1616 when Sir Walter Raleigh in indirect consequence lost his head." So begins the author's "exordium to a factual myth." Von Hagen's archaeological quest lasted 27 years, from 1947 to 1974.

The culmination is a book crammed with historical background on the European gold-seekers in South America. Much of the material on men such as Micer Ambrosius Dalfinger, Philip von Hutten and Gonzalo Jiménez de Quesada has seldom been covered elsewhere. Unfortunately, the author is too often a master of minutiae; obscure and irrelevant details about hometowns and ancestors mar the sense of history. Occasionally details are repeated from chapter to chapter, providing a kind of offbeat discontinuity.

Another jarring characteristic of the book is the ease with which the author describes the mass slaughter of both conquered Indians and conquerors in the madness of the gold search. Life was obviously cheap and the narrative reflects the cheapness. Men, for a century, were cut down by jungle, disease, starvation and sword. Few ever held in their hands the elusive gold which had beckoned them to their deaths.

Entire Indian villages were wiped out, either by direct attack, or as a result of serving as human pack animals. . . . Treks of many months covered only a few miles. Von Hagen describes one of Quesada's marches: "Shallow graves marked the way like milestones along Roman roads. The priests, for this was one of their functions, gave perfunctory last rites, then the grave was opened and shut

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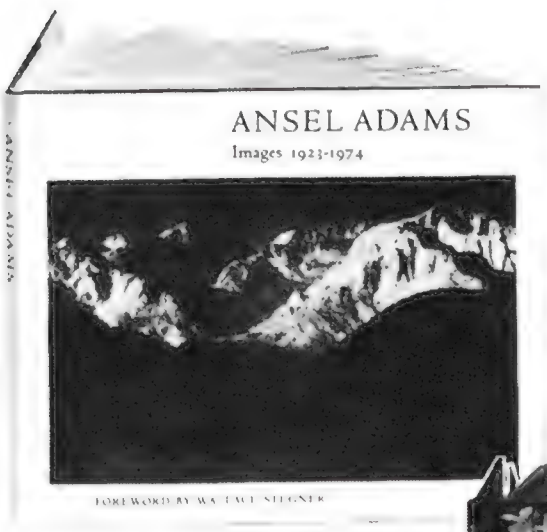

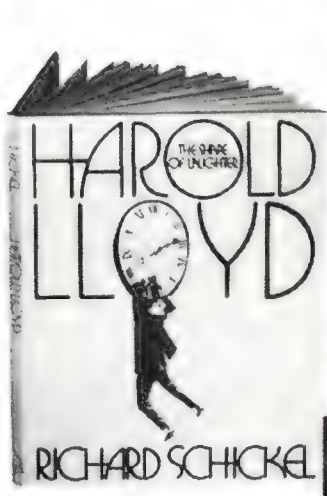

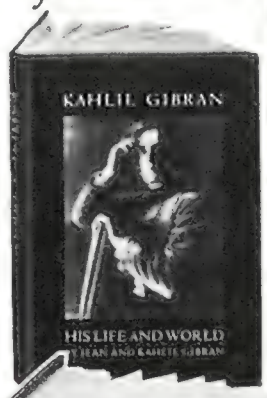

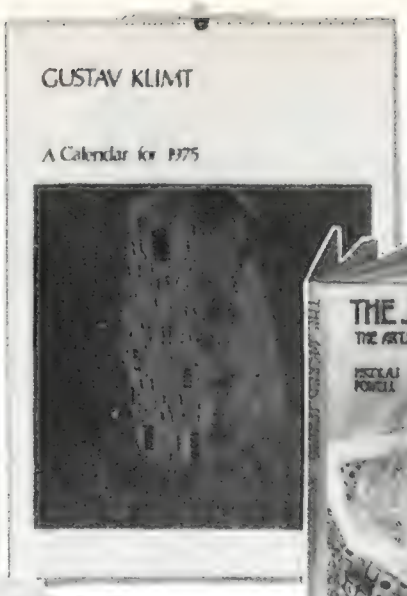

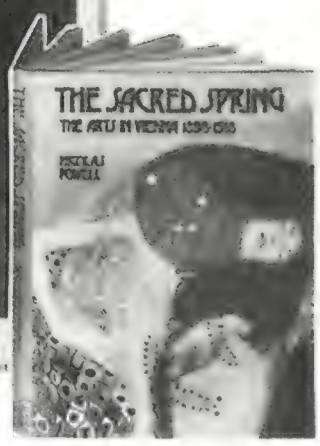

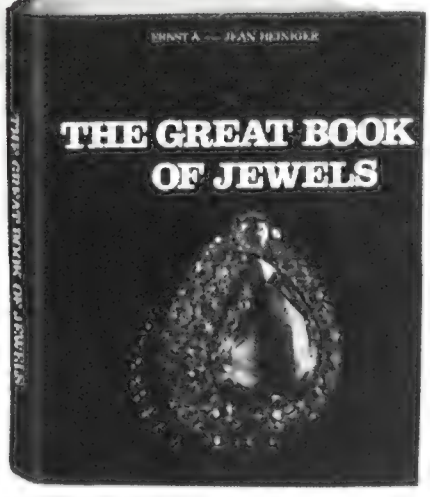

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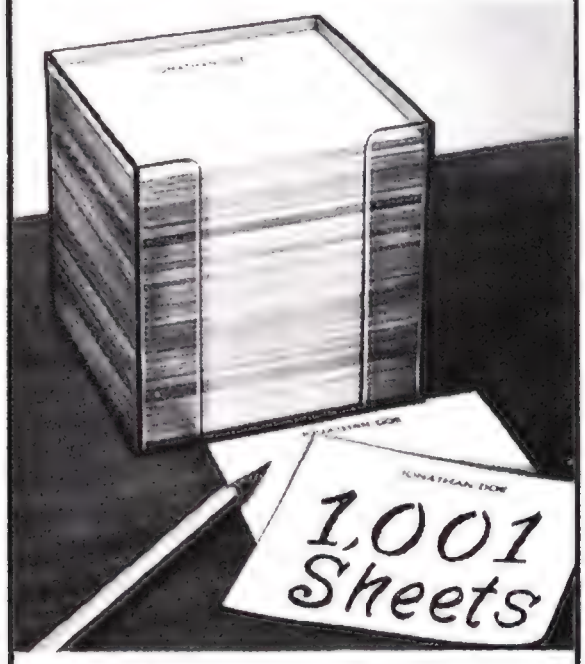

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in great haste. 'Sometimes,' the scrivener said, 'a hand clenched in its last agony was unable to be flexed and remained above the ground, seemingly to wave farewell to those who went in search of that accursed gold.'" The counterpoint beat of gold and greed is omnipresent.

The "golden man" whose tale grew into such a worldwide, century-long myth originated near Bogotá, Colombia, at Lake Guatavita. Guatavita was a sacred lake among the Chibcha Indians. They believed in a powerful deity who lived in the lake's depths. Each time a new chieftain was confirmed, the god had to be propitiated and the chieftain consecrated. The ceremony was so spectacular that witnessing Indians from other tribes carried their impressions back to their own tribal lands. While Chibchas encircled the lake, each holding golden offerings, the chieftain was anointed with a tree sap. On this body cover was then blown gold dust until he was gilded from head to foot. Then propelled to the center of the lake, he submerged in the frigid water until all the gold particles washed off and descended to the bottom. When he reached shore again, he was proclaimed chief and his people threw their golden trinkets in the lake.

The stories of such golden display fanned the flames of gold fever. The irony of history, however, was that the gold eventually found and taken from the Indians had required centuries to accumulate and represented no serious deposits. The Europeans had been too eager to believe in El Dorado.

The book is replete with illustrations, many of them color plates. There is an excellent bibliography, quite complete in English, German and Spanish titles.

Von Hagen also has a delicious sense of the humorous. It was, for example, customary for the Spanish conquerers to read the *Requirement* to the Indians, discussing the Papacy and the divine right of kings to claim the land. On one occasion, von Hagen records: "When this folderol had first been explained to one of the chieftains in the earliest days of the conquest, he had inquired how it was possible for anyone to give away lands that did not belong to him. When divine right was again submitted . . ., he replied, 'Then your Pope must have been drunk and your King an idiot.'"

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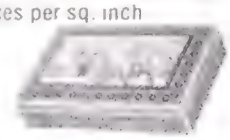

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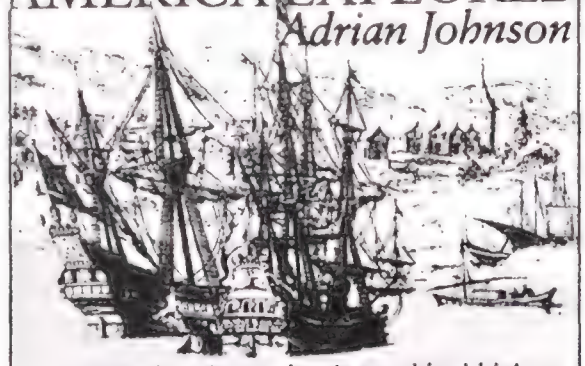

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The Secret of Crete
Hans Georg Wunderlich
(Macmillan, $7.95)

To the growing body of popular pseudo-archaeological literature may now be added *The Secret of Crete* by Hans Georg Wunderlich.

It will surely try the reader's patience, as he wades through the first hundred pages seeking the "secret," to be confronted with occult observations on the orientation of the corridors at Knossos, described as "directional locks" to bar "evil influences"; on the palace of Phaistos where the principal entrance is referred to as "from the west, the sunset side of evil omens and of death"; and, finally, on the reason for the royal family's choice of living quarters, for "would it not have been a good omen" to live on "the lucky eastern side of the palace?"

Finally the "secret" is revealed. The so-called palaces of Crete were "palaces of the dead," furnished with what Wunderlich tortuously describes as funerary equipment. Such a thesis totally contradicts the opinion of the majority of three generations of Aegean archaeologists and prehistorians, whose (according to Wunderlich) unimaginative minds and biases, plus a lack of "the geological viewpoint," has led them to overlook what the author describes as a Minoan obsession with the death cult.

This reviewer was a witness and co-sponsor for ten summers (1962-1971) of the excavations at Kato Zakros, the fourth Minoan palace. This Late Minoan palace site was unique in that it was the only one that had not been disturbed for 3,500 years, ever since the mud-brick walls fell in and left thousands of artifacts in situ. Wunderlich cites Zakros as a "mortuary palace."

I don't believe there is any evidence to support his theory. The palace of Zakros, like those of Knossos, Mallia and Phaistos, bears the unmistakable marks of a political, economic and cultural center, a vital dynamic complex engaged in international trade. In the industrial areas were found dozens of bronze tools, raw chunks of rock crystal from which finished objects were made, the unique double-boiler type of terra-cotta utensils for the manufacture of essences and unguents, and 12 two-man saws for the cutting of wood and stone.

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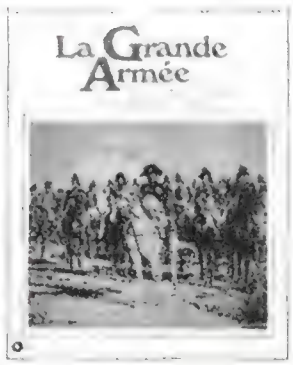

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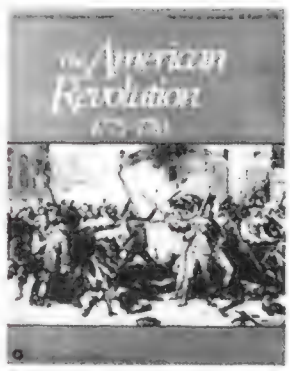

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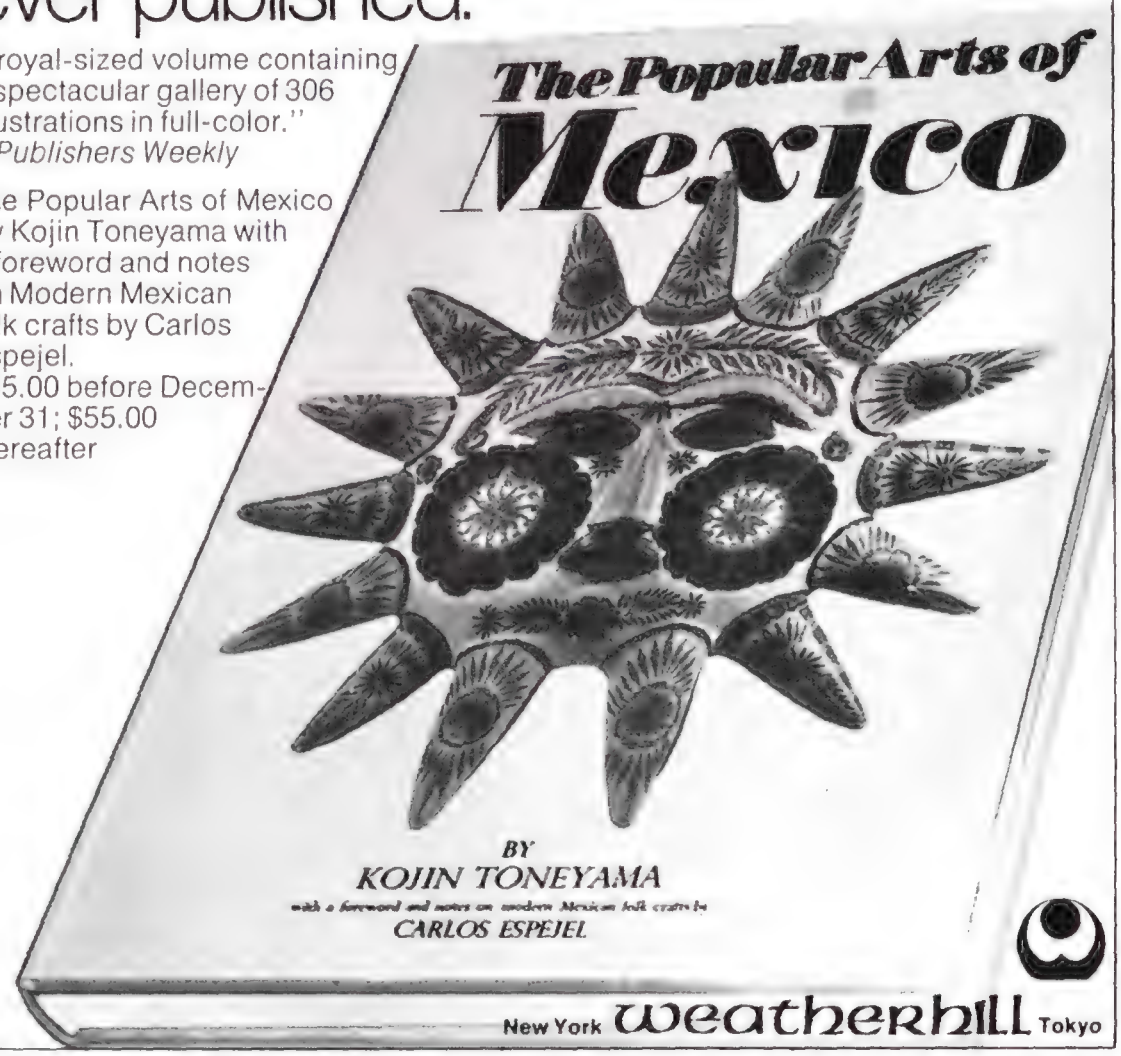

ing activity is enhanced by wine cups neatly laid out and a group of wine jugs nearby in the banquet hall. Also, there was a pile of animal bones apparently thrown out of a side window of the banquet hall. But no human bones were found on the palace site.

The author uses the Linear B tablets found at Knossos to reinforce his theory about the funerary aspects of the palaces. They are not, according to him, what philologists since 1952 have thought them to be—the work of grubby Mycenaean bureaucrats keeping inventories of herds, vessels, barley and chariot wheels—but rather "lists of bequests for payment of the funeral costs." Later, he postulates a special scribes' office where some of these inventory tablets (described as "books of the dead") were drawn up. The scribes' office, he says, would have existed "to carry on the correspondence from the living to the dead." He finds arithmetical errors on the tablets, which he compares to errors in Egyptian tablets and concludes that these "were not figures intended for serious administrative purposes; the calculations were for the cult of the dead who were not likely to check them." Why the dead would be interested in these boring inventory lists is explained: "The tablets, then, were shorthand notes given to the dead to take with them into the hereafter."

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While interdisciplinary interest in archaeology is to be welcomed, I find this book, its "secret" and its "science," an unqualified disaster.

—Leon Pomerance
Vice President of the Archaeological Institute of America in New York City

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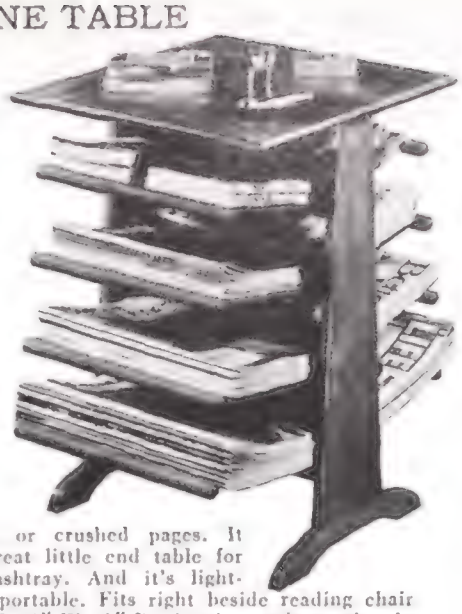

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National Collection of Fine Arts
"Eight from California" presents 38 lithographs, etchings, woodcuts and screen prints by eight artists, most of them in their late thirties, who have lived and worked in California. There is an element of humor in almost all the prints, ranging from obvious to subtle. Artists included in the exhibition are Terry Allen, Robert Bechtle, Joe Goode, Kenneth Price, Edward Ruscha, Wayne T. Wiley and the late John Altoon—opens November 29.

"Contemporary American Illustrators of Children's Books" features 155 drawings, prints and paintings by 32 artists. Most of the works are from published books illustrated by such artists as Adrienne Adams, Marsha Brown, Antonio Frasconi, Edward Gorey, Lynd Ward, Roger Duvoisin and Robert McCloskey. The exhibition, organized by the Rutgers University Art Gallery, will travel to various museums across the country during the next year—opens December 13.

Thirty-three sculptures and paintings by the Russian-born artist Ilya Bolotowsky are on exhibition at NCFA. Bolotowsky's style, known as Neo-Plasticism, is one of pure geometric art, devoid of any emotion or reference to nature. The artist, a prolific abstract painter since the 1930s, was highly influenced by the works of Piet Mondrian—opens December 20.

Divisions of Performing Arts and Musical Instruments
A Laura Dean Dance Concert presents a program of contemporary dance—December 8, 7:30 P.M., Renwick Gallery.

"Women in Country Music" features Kitty Wells—December 8, 8 P.M., Baird Auditorium, Museum of Natural History.

A recital by the concert pianist Alan Mandel opens the musical season at the Hirshhorn—December 15, 6 P.M., Hirshhorn Museum Auditorium.

For tickets and information about discounts for Resident Associates, senior citizens and students, call (202) 381-5395.

Puppet Theater, Arts and Industries Building
"The Book of Three" is an adventurous tale based on a book by Lloyd Alexander. It is a story of evil and good, a fantasy rooted in reality and truth. For ticket information, performance times and group reservations, call (202) 381-5395. Children under three excluded.

Renwick Gallery
"Contemporary Textile Art from Austria" presents a wide variety of 20th-century textile decorations. Cosponsored by the Smithsonian Traveling Exhibition Service and the Austrian Embassy, the show includes 33 new tapestries in the forms of wall hangings, appliqués, fabric sculptures, sewn objects and unique embroideries. The works demonstrate the freedom and creative symbolism that have evolved from the long tradition of carpet and tapestry weaving. Linda Christanell, Helen Knopp, Beatrix Brigitte Kaser, Sepp Moosman, Fritz Riedl and Marga Persson-Petraschek are among the ten Austrian artists represented in the exhibition. Many of the artists' preliminary sketches are included in the show. After several months at the Renwick Gallery, the exhibition will travel for two years to various museums across the country.

Christmas at the Museum Shops
Featured in all the museum shops are toys, gifts and Christmas tree ornaments from around the world. Of special interest are air and space tree ornaments, such as miniature airplanes, in the Arts and Industries shop; ornaments of natural straw and brass from India in the Natural History shop; and hand-blown glass and crystal ornaments in the new Hirshhorn Museum shop. In the Renwick Gallery shop, a special toy show opens for the holiday season. Hours for all shops are 10 A.M. to 5 P.M. daily.

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Travel Benefits for Smithsonian Associates

The three travel categories offer tours for every season, every taste and every purse. All tours are Smithsonian-sponsored, whether they are Foreign and Domestic Study Tours (small-group, specialized, intensive) or Foreign Charter Tours (larger-group, lower-cost).

FOREIGN CHARTER TOURS

Great Britain—May 1-15 or September 25-October 9: The National Gallery, Tate, Victoria and Albert; walking tours of literary London and excursions in the countryside; the best of London theater and performing arts ● **Russia**—May 8-22, May 21-June 4, October 2-16 or October 16-30: The Bolshoi Ballet, Moscow Circus, Hermitage; schools, factories and hospitals in Moscow, Leningrad and Riga ● Price of tours includes first-class hotels, most meals (full board in Russia), sightseeing, lectures, theater performances and round-trip air fare from New York ● Write **Robert Angle, 1000 Jefferson Drive,** Smithsonian Institution, Washington, D.C. 20560.

FOREIGN STUDY TOURS

Egypt and Ethiopia—January 4-26: Antiquities and sites (waiting list only) ● **Ancient Sites of the Maya**—January 11-30: *Argonaut* yacht cruise from Montego Bay to British Honduras, Guatemala and Yucatán. Optional return by air via Mexico City ● **The African Quest**—February 14-March 25: Board the *MTS Apollo* at Dar es Salaam; circumnavigate Africa to Dakar; cruise up the Congo River ● **Australia and New Zealand**—March 14-April 8: Flora, fauna and anthropology, via Tahiti and Fiji ● **Northern Spain and Southern France**—May 13-June 4: Cave paintings and the art of Paleolithic man ● **Classical Greece**—June 10-July 2: Archaeological sites in central Greece and the Peloponnesus ● **Copenhagen to Lisbon**—August 23-September 14: Art and architecture cruise aboard the *Argonaut* with stops at major European ports ● **Russia**—September 20-October 4: Art and architecture ● **Hawaiian Islands**—November 8-21: Petroglyphs and natural history ● Write **Miss Bliss Schumann, Foreign Study Tours, SI 123,** Smithsonian Institution, Washington, D.C. 20560.

DOMESTIC STUDY TOURS

Christmas at the Smithsonian—December 6-8: An old-fashioned tree-trimming party in the Castle; visits to U.S. Botanic Gardens holiday show and newly opened Hirshhorn ● **Winter Weekend in Sturbridge Village**—January 17-19: The atmosphere of old New England; meetings with local curators and historians; sleigh rides in the snow ● **Baja Whale Watch**—February 6-15: From San Diego to San Benito Island, San Ignacio Lagoon, Cedros and San Martin Islands on a 95-foot sport-fishing boat ● **Yellowstone Winter**—February 13-20: Photographic survey by snowmobile coach of still life and unusual winter lights; accommodations at Old Faithful Snow Lodge ● **Smithsonian Fine Arts Weekend**—March 7-9: An intensive visit with curators of the Smithsonian art museums ● **Georgia Burial Mounds**—March 19-25: Exploration of prehistoric cultures discovered at archaeological digs ● **Washington "Anytime" Weekend**—Choose any weekend to visit the nation's capital and enjoy a special tour of the Smithsonian Institution and other sites (three-day, two-night all-inclusive price is $54.95) ● Spring tours include a camping trip to **Death Valley** in April and a visit to **Arizona** in May to study Navajo and Hopi cultures ● Write **Domestic Study Tours, SI 106,** Smithsonian Institution, Washington, D.C. 20560.

Museum of History and Technology
"The Madrid Manuscripts of Leonardo da Vinci" is the first public display of a selection of original pages from the most recently discovered of Leonardo's notebooks. The 13 pages exhibited are rich with drawings which document the Renaissance master's fascination with machines and principles of motion—through December 30.

"Suiting Everyone" is a continuing multidisciplinary exhibit (see September SMITHSONIAN) tracing the 200-year history of American clothing. Beginning with stark contrasts in Colonial times between the tailored clothing of the wealthy few and the simple garb worn by the majority of Americans, the exhibit demonstrates the democratization of clothing brought about by the Industrial Revolution and the desire of every American for good quality clothing.

Anacostia Neighborhood Museum
"D.C. Art Association Exhibition" is a show of 50 works by approximately 37 local artists. The oils and acrylics of Lois Mailou Jones are included in the exhibition—through January 29.

Hirshhorn Museum and Sculpture Garden
The Smithsonian's newest museum (see p. 34) is now open to the public. The Hirshhorn collection includes 6,000 modern paintings and sculptures, some 800 of which are displayed in historical sequence in this exhibition. Internationally renowned works by Rodin, Henry Moore, Picasso, Calder, Matisse and Giacometti are among the acquisitions. Entrance is located at Independence Avenue, N.W.

Parking on the Mall
Metro construction has made parking on the Mall near the Smithsonian complex extremely difficult. All parking prior to 10 A.M. is restricted. The use of public transportation is recommended. Write Associates' Reception Center, Smithsonian Institution, Washington, D.C. 20560, regarding fringe parking locations and public transportation.

Fall Museum Hours
The Smithsonian museum buildings are open daily from 10 A.M. to 5:30 P.M. Hours for the National Zoological Park are 9 A.M. to 4:30 P.M. daily.

Traveling Exhibition Service
There are up to 70 different Smithsonian-sponsored exhibitions on display each month throughout the United States and Canada. For a complete listing and information on how to bring an exhibit to your area, write: Traveling Exhibition Service, Smithsonian Institution, Washington, D.C. 20560.

- Atlanta, Georgia—"American Coverlets" (The High Museum of Art, December 21-January 19).
- Jackson, Mississippi—"American Dolls" (State Historical Museum, November 30-December 29).
- Camden, New Jersey—"The Black Presence In the Era of the American Revolution" (Camden County Cultural and Heritage Commission, December 7-January 5).
- Bemidji, Minnesota—"In Beauty It Is Begun" (Bemidji State College, December 21-January 5).
- Hanover, New Hampshire—"Makonde Sculpture" (Dartmouth College, December 21-January 19).
- New York, New York—"Ride On," an exhibition about bicycles (First National City Bank, 399 Park Avenue, December 16-January 5).
- Pensacola, Florida—"Mary Bruce Sharon, An American Primitive" (Pensacola Preservation, December 28-January 26).
- Bronx, New York—"Manuscripts of the American Revolution" (The Bronx County Historical Society, December 7-January 5).

Smithsonian Commons
Located in the original Smithsonian Castle building, the Commons offers a new luncheon menu with individual service for a fixed price of $3.25. Hours are 11:30 A.M. to 2 P.M. Monday through Friday. An Associates card is required.

Chinese treasures
The extraordinary exhibition of archaeological treasures from the People's Republic of China (SMITHSONIAN, September 1973) is at last coming to the United States after a year and a half in Europe and Canada. It opens at the National Gallery of Art in Washington on December 13 and runs through March 30, 1975. The only other place it may be seen is at the Nelson-Atkins Gallery in Kansas City, April 20 through June 8.

HOLIDAY SHOPPING is never too hurried in Moore County, Tennessee. Generally, our citizens get a lot of it done with a visit to the Lynchburg Hardware and General Store.

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By Francis J. Walsh

My dear, let me explain about mistletoe

At this time of year you hang up a sprig of mistletoe under the chandelier at home or over the water cooler at the office and imagine simply that this represents an excuse to swipe a quick smooch from your wife, your sister-in-law, your secretary or some other cutie. But behind this simple ritual is a mass of myth.

In the first place, your romantic little sprig is a parasite. Some of the dwarf species of mistletoe spell outright murder for the conifers of the West and Southwest. A U. S. Department of Agriculture yearbook calls these parasites "the slow killers." Nobody decks the halls with this variety, but it did have significance to some North American Indians.

The true mistletoe, or the benign Christmas variety, goes under the name of *Phoradendron flavescens* in the United States. Break that down into its Greek parts and you get "phor," meaning "thief," and "dendron," the root for "tree." Literally: "tree thief." But that is only partly accurate. Mistletoe doesn't rob its host entirely. It makes its own sugar and starch from its own chlorophyll, but draws on the host for water and certain minerals. It seems the rugged oak and other hardwood trees can survive this kind of petty larceny so that fatalities in this class are rare.

Mistletoe seeds are carried from tree to tree by birds. Some crafty trees like the beefwood (sometimes called she-oak) can repel the more dangerous dwarf species by exuding a gum at the point of attack. So it goes with Mother Nature.

Thousands of years before it emerged as a holiday kissing excuse, mistletoe was the object of superstitious veneration and worship. The Druids, woodsy priests of the ancient Celts, saw something supernatural in a plant growing and flourishing without roots in the earth, and they chose to believe that it had fallen from the sky, possibly generated by lightning.

The Druids were finicky about the way they harvested the magical mistletoe. According to Pliny the Elder, the Roman naturalist, "They call it by a word in their language which means 'heal-all' and having made solemn preparation for feasting and sacrifice under the tree (always on the sixth day of the moon) they drive thither two milk-white bulls whose horns are then for the first time bound. The priest then, robed in white, ascends the tree and cuts off the mistletoe with a golden sickle. It is caught in a white mantle after which they proceed to slay the victims. . . ." And Thomas Bulfinch says that they drink "the water in which it has been infused and think it a remedy for all disease."

Many other cultures believed mistletoe to have mysterious and magical powers. Because it was found hanging in a tree without apparent means of support, it was thought to be a specific against the "falling sickness" and its leaves were carried in the pockets of epileptics.

The Japanese believed that it would make their gardens bear more plentifully. They plucked their mistletoe from the venerated willow, prayed over it, cut it into fine pieces, ate it, and sowed it with millet, rice and other seeds.

The Swiss shot it out of the trees with arrows. (Caution: better not kiss any Swiss miss under your mistletoe, you might get an arrow where your Adam's apple ought to be.) Lacking arrows, they knocked it out of the trees with rocks, making sure to catch it with the left hand. Always they observed the ancient tradition that it should not be cut with any base metal.

Italian and Swedish peasants thought mistletoe a protection against harm in general, fire in particular. They hung it in bunches from ceilings and rafters, hoping it would keep out evil spirits. In England and Wales in the olden days, the first cow that produced a calf after New Year's Day got a bouquet of mistletoe to be twined in her horns.

Generations of your long-gone forefathers thought that a sprig of the stuff under the pillow induced prophetic dreams and, for maidens, a glimpse of future husbands. But the present romantic notion that the sprig overhead automatically issues a license to steal a kiss comes from Scandinavian mythology. Washington Irving in his *Sketch Book* worked out a formula that said in effect, "One berry, one kiss." When berries are all gone, no more kisses.

Gardeners may be disappointed to learn that mistletoe cannot be cultivated. It just happens. Nowadays it is taken from its nesting place with either a rifle bullet or a contraption of hooks and ropes and poles and sent along to your friendly florist. The golden sickle, alas, is no longer used as a harvesting tool.

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